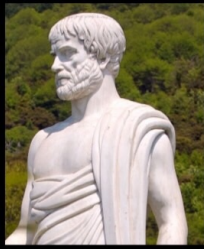


LOGIC GALLERY



David Marans

Aristotle	Apuleius	Plotinus/Porphyrus	Dharmakīrti	Avicenna
William of Ockham	Lorenzo Valla	Juan Luis Vives	Antoine Arnauld	Gottfried Leibniz
Isaac Watts	Bernard Bolzano	George Boole	Richard Whately	Gottlob Frege
Constance Jones	Bertrand Russell	Henri Bergson	Alfred Tarski	W. V. O. Quine

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Issue cgp01



Bodleian Library, Oxford

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Dedicated to
my beloved wife Sandra

My family

Mimi and Harris Levine, Elaine Marans, Robert and Diane Herzog

Brooklyn Center Academy class of 1956

Alice, Barry, Carol, David, Harriet, Howard, Jay, Lee, Lenore, Maxine, Richard, Ronnie, Steve



Acknowledgments

David Miller
Coventry, West Midlands

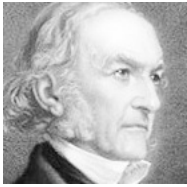
Claire Ortiz Hill	Stephen Read	Stephen Wolfram	Wolfgang Lenzen
Paris, Île de France	St. Andrews, Fife	Concord, Massachusetts	Osnabrück, Lower Saxony



*A clerk there was of Oxenford also, that unto **logyk** hadde long y-go.
Sownynge in moral vertu was his speech, and gladly wolde he lerne and gladly teche.*
Chaucer, *Canterbury Tales*

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Forewords # = also see [POSTAGE STAMP](#)



*Men are apt to mistake the strength of their feeling for the strength of their argument. The heated mind resents the chill touch and relentless scrutiny of **logic**.*

British Prime Minister, William Gladstone



*No, no, you're not thinking; you're just being **logical**.*

Danish physicist, Niels Bohr



*Fear is a disease that eats away at **logic** and makes man inhuman.*

American contralto, Marian Anderson



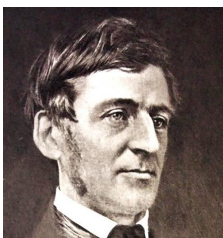
***Logic** is the technique by which we add conviction to truth.*

French satirist, Jean de la Bruyere



*Man has such a predilection for systems and abstract deductions that he is ready to distort the truth intentionally, he is ready to deny the evidence of his senses only to justify his **logic**.*

Russian novelist and journalist, Fyodor Dostoevsky



*If we consider those who have stimulated and profited us, we shall perceive the superiority of the spontaneous or intuitive principle over the arithmetical or **logical**. The first contains the second, but virtual and latent. We want in every man a long **logic**; we cannot pardon the absence of it, but it must not be spoken. **Logic** is the procession or proportionate unfolding of the intuition; but its virtue is as silent method; the moment it would appear as propositions and have a separate value it is worthless.*

American essayist, Ralph Waldo Emerson



*Pure **logic** is the ruin of the spirit.*

French writer and aviator, Antoine de Saint-Exupéry

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*Crime is common. **Logic** is rare. Therefore it is upon the **logic** rather than upon the crime that you should dwell. You have degraded what should have been a course of lectures into a series of tales.*

Fictional detective, Sherlock Holmes



*Instinct is something which transcends knowledge.
We have, undoubtedly, certain finer fibers
that enable us to perceive truths when **logical** deduction,
or any other willful effort of the brain, is futile.*

Serbian-American scientist-inventor, Nikola Tesla



***Logic** can be patient, for it is eternal.*

British electrical engineer, Oliver Heaviside



*I have always respected those who defend grammar and **logic**.
We realize, fifty years later, that they averted serious dangers.*

French novelist, Marcel Proust



*The decay of **Logic** results from an untroubled assumption
that the particular is real and the universal is not.*

British author and Christian-apologist, C. S. Lewis



*We especially need imagination in science.
It is not all mathematics, nor all **logic**,
but it is somewhat beauty and poetry.*

Italian education reformer, Maria Montessori



***Logical** consequences are the scarecrows of fools
and the beacons of wise men.*

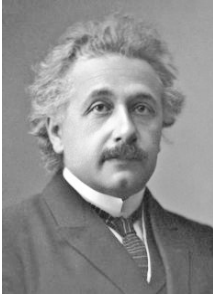
British biologist, Thomas Henry Huxley



***Logic** is doubtless unshakable,
but it cannot withstand those who want to go on living.*

Bohemian novelist, Franz Kafka

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*There is no **logical** way to the discovery of these elemental laws.
There is only the way of intuition
which is helped by a feeling for the order
lying behind the appearance.*

German/Swiss/American physicist, Albert Einstein



*Better to be without **logic** than without feeling.*

British novelist, Charlotte Brontë



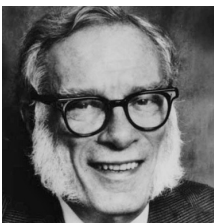
*If the opponent offers keen play,
I don't object; but in such cases I get less satisfaction,
even if I win, than from a game
conducted according to all the rules of strategy
with its ruthless **logic**.*

Russian chess grandmaster and world champion, Anatoly Karpov



*The best men have their blind spots,
and sometimes they feel almost crushed
at how little respect **logic** can show them.*

French novelist, Victor Hugo



*You can prove anything you want by coldly **logical** reason---
if you pick the proper postulates.*

American science and science fiction author, Isaac Asimov



*But that's men all over. Poor dears, they can't help it.
They haven't got **logical** minds.*

British mystery novelist and poet, Dorothy Sayers



*Humor is something that thrives
between man's aspirations and his limitations.
There is more **logic** in humor than in anything else,
because, you see, humor is truth.*

Danish concert pianist/comedian, Victor Borge

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PREFACE

Strictly speaking, *Logic Gallery* is not a contribution to stylized scholarship.

It does not propound a philosophical/logical thesis.

No part of it will ever appear in a professional journal. And it is not a response to some critique.

Rather, it is an enhanced chronology of the history of an Idea—**Logic**— so as to:

- (1) Chart both the continuity and growth of logic through the centuries since ancient Greece
- (2) By quotations, salute the Pantheon that has promoted, elaborated, refined, and advanced the idea
- (3) Portray the recognized importance of logic over the course of Western civilization.
- (4) Sketch the lives of those most recognized in the history of logic
- (5) With images, further depict their lives, their cultural milieus, and historical contexts
- (6) Be particularly useful in the classroom by fostering discussion and follow-up
- (7) Here and there evoke a smile

Further Resources

[The Development of Logic, William and Martha Kneale](#), the long standing opus, Print only

[A History of Formal Logic, Józef Bochenski](#), PDF

["The History of Logic", Peter King and Stewart Shapiro](#) PDF

[The History of Logic: Aristotle to Gödel](#) Raul Corazzon's extraordinary and impressive digital achievement



David Marans

[AUTHOR PROFILE](#)

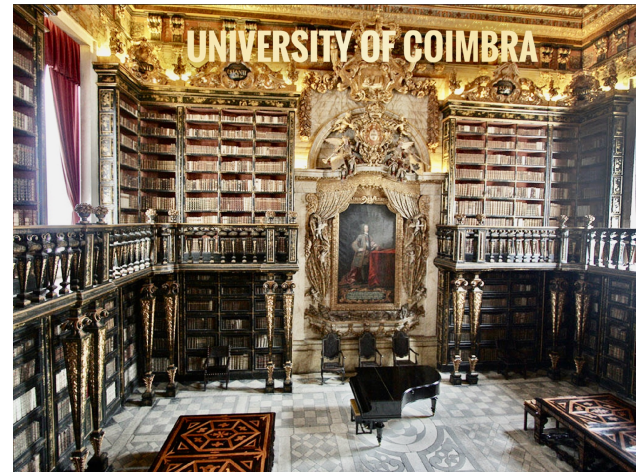


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NB: As the pages are in chronological order, **IT IS VERY ADVISABLE** to start with a full read **WITHOUT THE HYPERLINKS** so as to appreciate both continuity and growth from Classical to Medieval to Enlightenment to Modern to Contemporary, and surely NOT just jump past unfamiliar figures (several of which are surprising). Thereafter, this HYPERLINK table is more useful.

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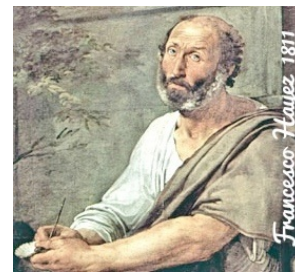
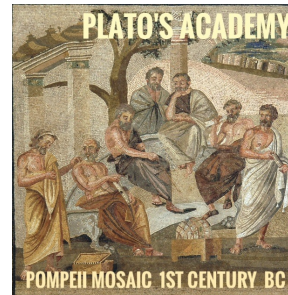
[Alfred Tarski](#)

TOC

In correct **logic**,
certain things are supposed,
and something else results of necessity.*

Logic is useful, by its ability
to raise searching difficulties
on both sides of a subject
and make us detect more easily
the truth and error
about the several points that arise. **

If we ought to philosophize,
then we ought to philosophize.
And if we ought not to philosophize, then
we ought to philosophize
[to prove we ought not].
Thus, we ought to philosophize.***



Aristotle

Greek, born Stagira, 382 B.C.

*Organon: Categories, Interpretation, *Prior Analytics, Posterior Analytics, **Topics, Sophistical Refutations*
****Protrepticus*

Physics, Astronomy, The Soul, Animals, Metaphysics, Ethics, Politics, Rhetoric, Poetics,.. more

The most influential logician and encyclopedic mind, ever

Massive works in logic, the *Organon*, unchallenged for over 2000 years

The founder of the science of logic in Western civilization

Mentor to famed ruler Alexander The Great

At Plato's Academy for 20 years, becoming Plato's assumed successor

But left Athens to head the Lyceum school when Plato selected Speusippus

Nearly half of his works still lost!!

Lunar crater named for him

<http://www.ucmp.berkeley.edu/history/aristotle.html>

http://www.logicmuseum.com/joyce/reid_aristotle.htm

FIND STAINED GLASS WINDOW

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Those who force us to give an argument
for the axiom of contradiction
are most stupid and violent.
For he who opposes this axiom
immediately does away
with the use of reasoning and demonstration.
For if nothing is more than its opposite, what is the use
of reasoning and **logical** proof and conclusion?
And what is the fruit of all this activity,
when he who tries to defend the axiom
is forced to use in its proof
something inferior to it in respect of self-evidence?*

attributed to Theophrastus by Syrianus

cf. [Aristotle](#), [Epictetus](#), [Boutroux](#)

and on the axiom of contradiction cf. [Blanshard](#)

If the proposition A then B, if B then C;
hence if A then C.

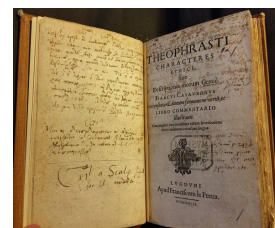
If A then B; if not A then C; hence if not B then C.

If A then C; if B then not C; hence if A then not B.*

The three primary Hypothetical Syllogisms

attributed by [Boethius](#) and by [Alexander of Aphrodisias](#)

and cf. [Chrysippus](#)



Theophrastus

Greek, born Eresos, Metileme, c. 371 B.C.

On First Principles

Enquiry into Plants

On Characters a remarkable catalogue of the enduring character types in mankind (see link below)

On Sweat, Dizziness, and Fatigue; *On Weather Signs;* *On Stones*

*Project Theophrastus the ongoing research project to publish all references, attributions, and snippets

Life, Writings, Various Reports, Logic, Physics, Metaphysics, Theology, Mathematics.

Successor to Aristotle in the Lyceum

Considered the father of botany

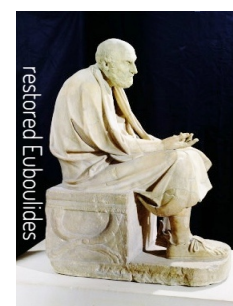
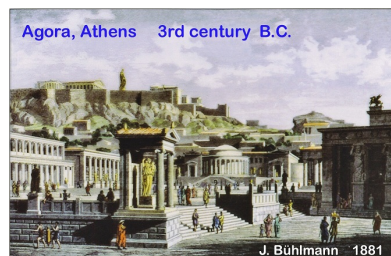
Most of his writings lost

Said to have remarked ***“We die just when we are beginning to live.”***

Lunar crater in his name

https://books.google.com/books/about/Theophrastus_of_Eresus_Logic_texts_68_13.html?id=rs2LTFomqPcC

[On Characters](#)



To follow the scent of an animal,
the hunting dog uses this **logic**:

“The animal went either
by this road, or by that, or by the other:
but it did not go by this nor that,
thus it went the other way.”

In Sextus Empiricus, *Outlines of Pyrrhonism*, 2nd Century A.D.

Chrysippus

Greek, born Tarsus, 280 B.C.

Head of a school in the Agora's Painted Colonnade

Several hundred books, none of which survive, only fragments and secondary sources remaining

In Diogenes Laertius, *Lives of Eminent Philosophers* (see above)

Work encompassed logic, nature, theology, and much more

Argued that logic pervades all of Nature

His five postulates of logic:

- | | |
|--|------------------------------|
| 1. If the first, then the second. The first. Therefore, the second. | Modus Ponens |
| 2. If the first, then the second. Not the second. Therefore, not the first. | Modus Tollens |
| 3. Not both the first and the second. The first. Therefore, not the second. | Incompatible Argument |
| 4. Either the first or the second. The first. Therefore, not the second. | Strong Disjunctive Argument |
| 5. Either the first or the second. Not the first. Therefore, the second. | General Disjunctive Argument |

Work obscured for over 2,000 years, then revived and blossomed since mid-19th century

(*sed videre*: [Albert of Saxony](#) and [Thomas Bradwardine](#))

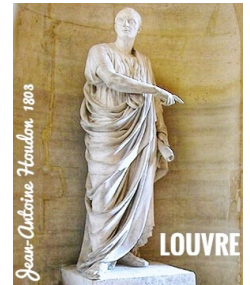
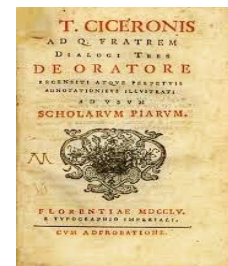
In debate, would often be the only speaker and argue both sides of the question

Said to have died in a fit of laughter after drinking wine and watching a donkey eat figs

<http://phoenicia.org/chrysippus.html>

<http://philpapers.org/archive/BOBSS.1.pdf>

In **logic** there are no directions
how truth may be discovered,
but only how it may be judged.
Following it, we resist
the force of an argument
by showing that the conclusion
cannot be deduced from the premises.*



Marcus Tullius Cicero

Roman, born Arpinum, 106 B.C.

**On Oratory and the Orator*

On the Republic, On the Laws, About the Ends of Goods and Evils

On the Nature of the Gods, On Friendship On Duties

Countless speeches; over 800 letters

Acknowledged and praised as the greatest orator, ever

Established Latin as prominent for sixteen centuries in western civilization

Fashioned a prose style which in nineteen centuries has not been equaled

Strove (unsuccessfully) to save the freedom of the Roman Republic

Inspired the founders of the United States and the leaders of the French Revolution

Politically inept and ill-advised, was often entangled in jealousy, turmoil, and intrigue

A threat to the new Roman Dictators, was falsely accused, hunted down, and assassinated

Theorized, long before Copernicus, that the earth moves through space

<http://darkside.hubpages.com/hub/cicero>

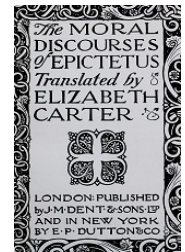
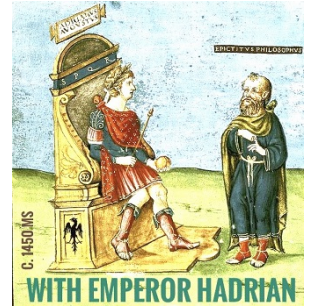
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TOC



When one of those who were present said,
“Persuade me that **logic** is necessary,”
Epictetus replied,
“Do you wish me to prove this to you?”
The answer was, “Yes.” And Epictetus replied,
“How then will you know
if I am cheating you by my argument?”
The man was silent.
“Don’t you see,” said Epictetus,
“that you yourself are admitting
that **logic** is necessary,
if without it you cannot know so much as this:
whether **logic** is necessary or not necessary?”*

cf. [Aristotle’s *Protrepticus*](#)



Epictetus

Greco-Roman, born Hierapolis, 55 A.D.

**Discourses* (compiled by his student Arrian)

Born a slave, taken to Rome, urged by his owner to study philosophy with the leading masters

Soon, and still a slave, began lecturing and teaching

Later, having gained his freedom, attracted a great many students to his own school

Reestablished his school in Nikopolis after Emperor Domitian expelled all philosophers

A leading figure in the Stoic tradition

Became widely known for his wisdom

Strove to fathom the Rational and Moral basis of life

Insisted that we can and must control ourselves, since we have little control of events

Though probably never married, did adopt and raise an abandoned orphan

<http://www.roangelo.net/logwitt/epictetus.html>

TOC

The love of wisdom, which we call philosophy, has three parts:
physics, ethics, and that of which I now propose to speak—**logic**.....
Now therefore it must be explained how it must be that the original four propositions
are affected towards each other, for which it will not be foreign to the purpose
to survey in a square form.

There are in the upper line as may be seen in what follows.
the universal affirmative and universal negative,
and these are said to be *CONTRARY* to each other.

Likewise in the bottom line are particulars, and these are said to be *SUBCONTRARY*.

Afterwards two oblique angular lines are drawn
of which one extends from universal affirmative to particular negative,
but the other from particular affirmative to universal negative
which propositions being contrary to each other both in quantity and quality
are called *CONTRADICTORY*.

Between the subcontrary propositions and those that are contrary
there is a divisible opposition,
because the contraries are never indeed at one and the same time true,
yet are sometimes at once false.

Yet those that are subcontrary are never at one and the same time false,
yet sometimes are at once true

and on this account the refutation of either of them confirms the truth of the other,
though the confirmation of the truth of either does not confute the other.

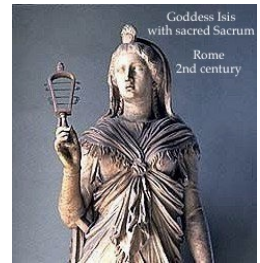
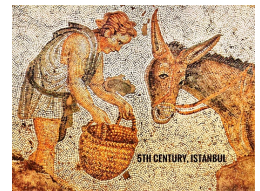
He indeed who confirms that either of two contraries is true subverts the other
yet it does not follow that he who subverts either establishes on that account the other.

But between those propositions that are contradictory
there is complete opposition.

For he who proves the truth of the one refutes the other,
and he who refutes the one establishes the truth of the other.

Moreover every universal proposition when proved to be true
confirms its own particular proposition, [said to be the *SUBALTERN*],
but he who refutes the universal does not on that account refute the particular.

However, he who refutes particular proposition
confutes also its own universal proposition,
but when proved to be true does not establish it.*



Apuleius

*There is no diagram in the Apuleius text.
This inserted in a 9th century manuscript.*



Roman, Numidian Berber, born Madaurus, c. 124

**Perihermeneias* Book III of *The Philosophy of Plato* (lays out the first Square of Opposition)

Metamorphoses (*The Golden Ass*) sole surviving Latin novel; model for subsequent picaresque literature

Apology (successful eloquent defense when tried for seducing his wife by magic and wizardry)

Even so, somewhat active in the Cult of Isis and the future's primary resource regarding it

Depleted considerable family inheritance through travel, study, and fraternity

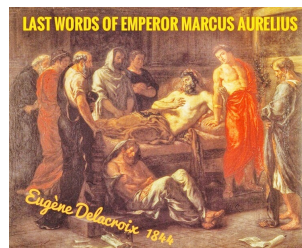
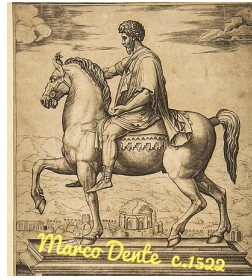
Regained status and fortune through acclaimed oratory and marriage to an older and wealthy widow

A leading figure in the neo-Platonism of the age

<http://web.eecs.utk.edu/~mclennan/papers/Apuleius-long.htm>

They are true fugitives, who fly from λόγος
[**logic**, reason] by which we inquire.

True happiness requires very little.
You may despair that you will ever be
a good logician or a good scientist....
But through error and needless wandering,
you know many false paths to happiness.
Neither syllogisms, refinements in **logic**, wealth,
awards, reputation, nor pleasure can attain it.
How is it found? — only by doing that which
makes you just, temperate, courageous, liberal,
and by understanding
that there is nothing truly evil and hurtful
except that which causes the contrary.*



Emperor Marcus Aurelius

Roman, born Ucubi, Boetica, 121

* *Meditations*, originally titled “Things To One’s Self”

A masterpiece of Stoicism, recognized as one of the most influential books in Western thought

Emperor of the Roman Empire, 161-180 AD

Studied with the foremost philosophers

Military campaigns much delayed the invasions and fall of the empire

Troubled by the increasingly brutal persecution of Christians, but did nothing to stop it

Death marked the end of the 200 year *Pax Romana*

<https://dailystoic.com/marcus-aurelius/>

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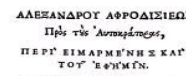
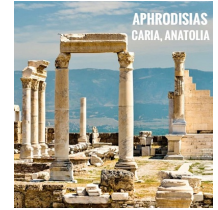
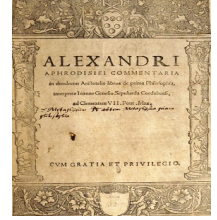
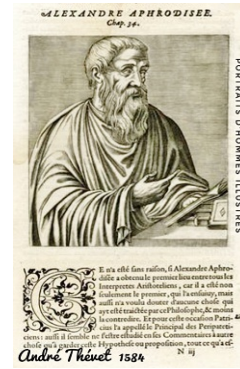
https://books.google.com/books/about/The_Meditations_of_Marcus_Aurelius.html?id=AlXwLh0TA1wC

<https://ia802605.us.archive.org/3/items/meditationsofmar00marc/meditationsofmar00marc.pdf>

TOC

It is not possible
to **logically** infer what is false
from things that are true.

All that is proved
through what is true
is true itself.*



Alexander of Aphrodisias

Eastern Mediterranean, born Caria, 180 A.D

**Commentary on Aristotle: Topics*

Other Aristotle commentaries: *Organon*, *Meteorology*, *Sense and Sensibilis*, *Metaphysics*

Original works: *On the Soul*, *Ethical Problems*, *On Fate*, and *On Mixture and Growth*

Several works lost

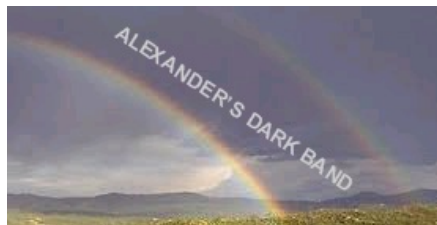
A widely respected scholar and head of a school for philosophy

Virtually nothing known of his life

A primary conduit of the unquestioned Aristotelian logic for over 2,000 years

His non-transcendent god much emulated by Renaissance humanists

First to describe it, the Alexander Effect in rainbows named for him



<http://www.informationphilosopher.com/soluti>

[ons/philosophers/alexander/](#)

<http://peenef2.republika.pl/angielski/hasla/a/alexanderofaphrodisia.html>

TOC

Logic is the precious part of Philosophy.

We must not think of it as the mere tool of the metaphysician.

Logic does not consist of bare theories and rules:

it deals with verities; Existences are, as it were,

Matter to it, or at least it proceeds methodically towards Existences, and possesses itself, at the one step, of the notions and of the realities.

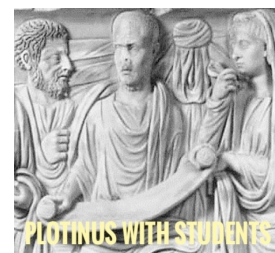
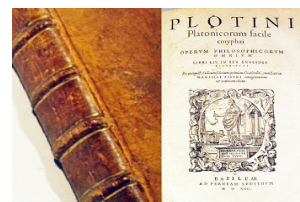
Untruth and sophism it knows, not directly, not of its own nature, but merely as something produced outside itself, something which it recognizes to be foreign to the verities laid up in itself

In the falsity presented to it, **logic** perceives a clash with its own canon of truth.

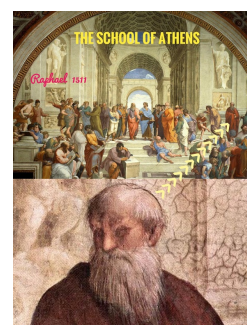
Logic, that is to say, has no knowledge of propositions, but it knows the truth and, in that knowledge, knows what the schools call their propositions.

Logic knows above all, the operation of the soul, and, by virtue of this knowing, what is affirmed and what is denied, whether the denial is of what was asserted or of something else, and whether propositions agree or differ

All that is submitted to **logic**, it attacks with the directness of sense-perception, and **logic** leaves petty precision of process to what other science may care for such exercises.*



Enneads, 14th century MS



Plotinus

Greek, born Lycopolis, Egypt, 210

**Enneads*, #1, Third Tractate

Biography, by his student [Porphyry](#): “Lectures by Plotinus had the air of conversation, and he never forced upon his hearers the severely logical substructure of his thesis.”

Credited with preserving Platonism and expanded it into Neoplatonism

Traveled extensively to be with the best minds of the time

Against creation *ex nihilo*, held that creation emanates from an ultimate source – The ONE

The ONE being beyond our conception, devoid of being and nonbeing

Happiness lies only through proximity to the world’s creative origin – The ONE

Insisted that earthly fame and fortune are illusions

Eventually came to Rome where he studied, wrote, and taught until death

Avoided all forms of imagery and unfounded superstition

<http://www.john-uebersax.com/plato/enneads.htm>

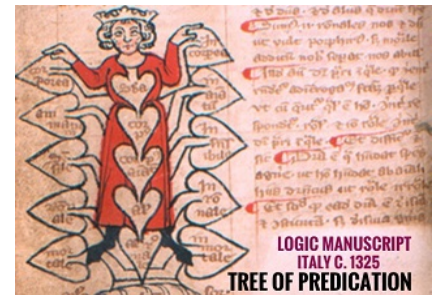
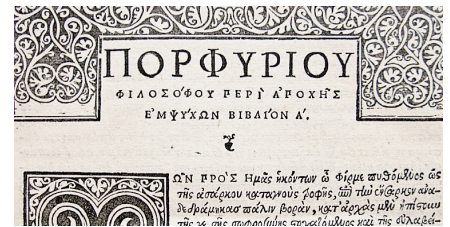
<http://www.sacred-texts.com/cla/plotenn/enn001.htm>

PORPHYRY: If ‘large’ and ‘small’
were used absolutely
and not with reference to something else
of the same kind as their subjects,
then a mountain could not be called small
nor a millet seed large.

STUDENT: Can you state this argument
in a concise and **sylogistic form**?

PORPHYRY: I can, as follows:
Quantity is predicated absolutely,
while ‘large’ and ‘small’
are not predicated absolutely.

Thus ‘large’ and ‘small’ are not quantities.* §



Porphyry

Phoenician, born Tyre, 234

Isagogue

An introduction to Aristotle’s works on logic

The primary logic text for over 1000 years and even taught well into the 20th century

* Short *Commentary on Aristotle’s Categories* (*Great Commentary* unfortunately lost!)

Life of Plotinus (and compiler/editor of *Enneads*)

Philosophy from Oracles, Against the Christians, Commentary on Euclid's Elements

Abstinence from Eating Animal Foods, Letter to his wife, Marcella (of interest---- see 3rd link)

Metaphorically, classified all Being as a “Tree of Predicates”

Scholar of great learning, with wide ranging interests, even vegetarianism and ecological preservation

Argued for maintaining a simple lifestyle

Firmly held that reason exercised by a pure mind leads to the true essence of things

Urged intellectual activity to detach the soul from passion and confusions, thereby finding true realities

Attacked Christianity as appealing to irrational mysteries and rituals

§ Similarly, a three meter snake is (quantitatively) three meters in length absolutely, and not only in comparison with other snakes. But whether it is a long snake or a short snake depends on how its length compares to the lengths of other snakes. In a tank with 50 one meter snakes it is long, but with 50 six meter snakes it is short.

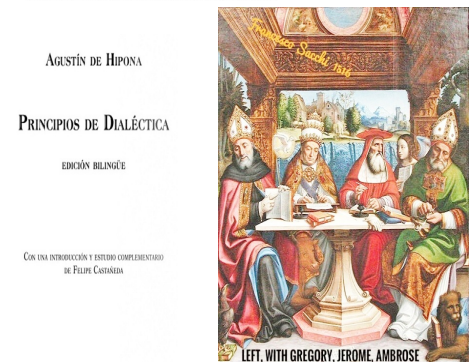
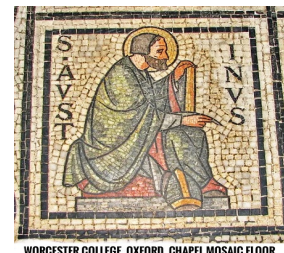
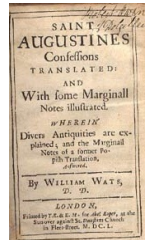
<http://faculty.arts.ubc.ca/pbartha/phil312/p312ho1.pdf>

<http://books.google.com/books?id=4Zh2Ft96W-wC&printsec=frontcover&dq=intitle:Porphyry&hl=en&sa=X&ei=aj2UNnhLoem9ASeuoGIDg&ved=0CEMQ6AEwAjgK#v=onepage&q&f=false>

<http://www.kheper.net/topics/Neoplatonism/Porphyry.htm>

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When judgment is given
concerning the conjunction of sentences,
it must wait until we come to the culmination of the syllogism.
The conclusion is that which results from concessions
What I am saying is this:
Whoever says “if he is walking, he is moving”
wants to prove something,
so that when I concede that this is true
he needs only to say what walks
and the conclusion will [logically] follow
and now cannot be denied, that is, that he moves,
or he simply has to say that it does not move,
so that the conclusion again follows and cannot be denied,
namely that he does not walk.
And again in like manner if someone says “this man walks,”
it is a simple sentence; if I concede this one
and he adds another, “Whoever walks, moves”,
and I likewise grant this one,
from the conjunction of sentences,
though uttered singly and conceded singly,
the conclusion follows, which is now of necessity conceded,
namely “Therefore, this man moves”.*



Saint Augustine

Roman African, born Tagaste, 354

* *On Dialectics* (Augustine credits [Chrysippus](#) for these rules of Logic)

Confessions (considered one of the most significant autobiographies, ever)

City of God, *On the Trinity*

Surviving works: 113 books and treatises, 200+ letters, 500+ sermons

Converted to Christianity at age 31, installed Bishop of Hippo (Tunisia) in just nine years

Canonized Doctor of the Church in 1330

Theologian and philosopher, writings significantly formed and infused Catholicism and western philosophy

Theology highly regarded and adopted by Martin Luther and the Protestant Reformation

Led the charge of Heresy against the Donatists and Pelagians

Held that man has God-given Inner Illumination whereby to grasp intelligible realities.

Patron saint of brewers

<http://justus.anglican.org/resources/bio/50.html>

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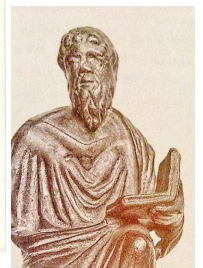
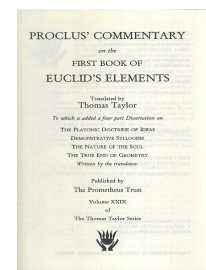
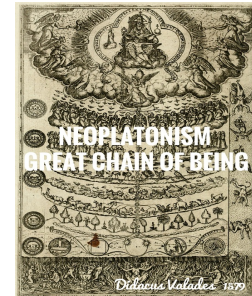
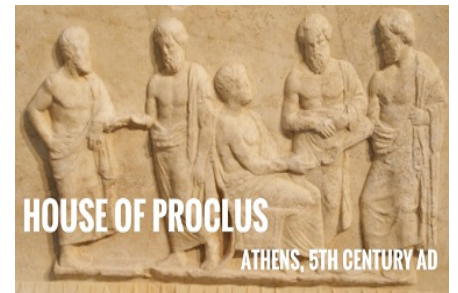
http://www.sophia-project.org/uploads/1/3/9/5/13955288/weber_augustine.pdf

TOC

Logic proceeds by syllogisms
in an orderly progression
from principles simple and evident,
to the most remote and complicated conclusions.
Its inherent reasons remain perpetually the same,
firm and durable, and cannot be confuted.

....

She reminds you
of the invisible form of the soul.
She gives light to her own discoveries.
She awakens the mind and purifies the intellect.
She brings light to our intrinsic ideas.
She abolishes oblivion and ignorance
which are ours by birth.*



Proclus

Byzantine, born Constantinople, 412

**Commentary on Euclid*

Astronomy, Book of Causes, Elements of Theology

Elements of Physics, Platonic Theology

Scholar, mathematician, commentator

Preserved and transmitted texts from ancient Greece

Student, teacher, and then head of the Neoplatonic Academy

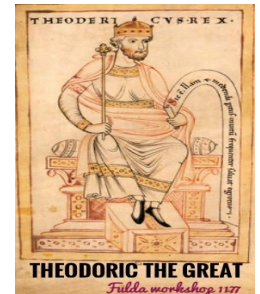
Composed hymns for the polytheistic religion of the time

A life-long vegetarian, and extremely self-disciplined

Lunar crater named for him

<http://www.goddess-athena.org/Encyclopedia/Friends/Proclus/index.htm>

To prevent reason
from being exercised haphazardly
and to ensure that it be practiced
according to certain rules,
it is good first to discuss
the nature of reasoning itself.
This discipline, **logic**,
is the ‘mistress’ of discourse.
Logic deals with true
and necessary argumentation
of antecedents and consequents.
The only thing we should consider
is that when one has been asserted,
the other follows by necessity.*



Boethius

Roman, born Rome, 480

Aristotle's Organon (first Latin translation – for 700 years a primary source book in logic)

**On Cicero's Commentary on Aristotle's Topics*

On Arithmetic, On Geometry, Foundations of Music

Moved to the Eastern Empire and became trusted advisor and diplomat for King Theodoric the Great

Feared by corrupt aristocrats, was falsely convicted and imprisoned, tortured, and executed

In prison, wrote *The Consolation of Philosophy*, the ever since enshrined dialogue between

Lady Philosophy and Boethius, the theme being the transience and illusion of all earthly greatness
and the superiority of the things of the mind

Arguably instrumental in introducing arabic numerals into Europe

Declared a martyr, never Canonized but regarded a Saint in some locals, feasted on October 23rd

Buried along side St. Augustine in Pavia, near Milan

Lunar and Mercurial craters named for him

<https://faculty.georgetown.edu/jod/boethius/boebio.html>

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Logic [dialectic] and rhetoric are like the clenched fist and the open palm of a man's hand: the former pinches words, the latter extends them.

While **logic** is sharper for examining things, rhetoric is more fluent for those it strives to teach.

Logic sometimes appears in schools; rhetoric continually comes to the public forum.

Logic teaches very few students; rhetoric often reaches the whole populace.....

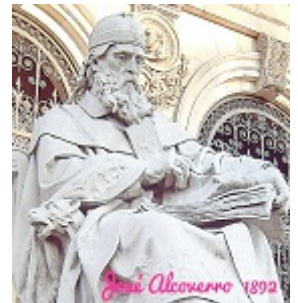
Logical syllogisms follow from here, where the usefulness and power of the whole art become clear.

The conclusions of these syllogisms greatly aid the reader in investigating the truth, to the extent that the error of deceiving the opponent by the sophisms of false conclusions may be banished.*

Regarding logic vs/ rhetoric also see [Llull](#), [Bacon](#), and [Hobbes](#).



Dante's *Paradiso*
by Giovanni di Paolo c. 1445



Madrid: National Library

Saint Isidore of Seville

Spanish, born at Cartagena, 560

**Etymologies*, chapter II

A lengthy encyclopedia of great importance in the preservation of Greco/Roman/Mediterranean sources.

A standard source of knowledge for 1000 years: grammar, science, theology, history, jurisprudence, philosophy, medicine, logic, rhetoric, politics, natural science, biography, drama, entertainment, dress, and more

Bishop of Seville, converted Visigoths from Arianism, established schools, endowed libraries

Arguably spared Spain from the Dark Ages; willed all his possessions to the poor

“Last of the great Latin Fathers”, “Schoolmaster of the Middle Ages”

Canonized 1598, Doctor of the Church 1722

His two brothers and his sister also Canonized

Antarctic island named for him

Patron saint of the Internet 2002, the authorized logon prayer:

Almighty and eternal God,
who created us in Thy image
and bade us to seek after all that is good, true and beautiful,
especially in the divine person of Thy Only-begotten Son,
our Lord Jesus Christ,
grant, we beseech Thee,
that, through the intercession of Saint Isidore, Bishop and Doctor,
during our journeys through the internet
we will direct our hands and treat with charity and patience
all those souls whom we encounter.
Through Christ our Lord. Amen.

And The International Order of St. Isidore of Seville—promoting Christian chivalry online



<http://www.st-isidore.org>

TOC

The proper domain of inference is the threefold **logical** tie:
the necessary presence of the reason in the subject of the conclusion,
its necessary presence in similar
and its absolute absence in all dissimilar cases. §

....

A **logical** reason does not produce cognition accidentally.

But it produces knowledge by **logical** necessity
as an ascertained case of invariable concomitance.

The function of the **logical** reason is to produce cognition,
and this is just what is meant by ascertainment
of the reason's invariable concomitance with the latter.

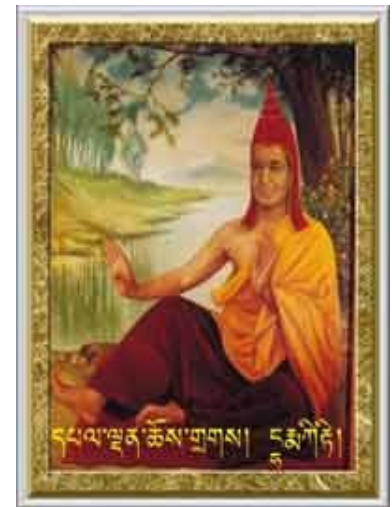
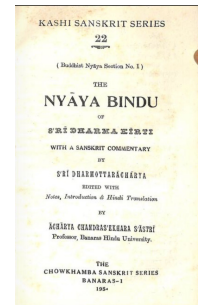
First of all, as a preliminary step, we must be certain
that the presence of our **logical** reason is necessarily dependent
upon the presence of the predicated consequence,
we must verify it by trying to find contradictory facts.
We then can proceed to syllogize and avail ourselves
of the general proposition recorded in our memory,
the proposition intimating that its subject
is invariably concomitant with its predicate.

....

There is no absolute necessity
of expressing separately the conclusion.

Supposing the reason has been cognized
as invariably concomitant with the deduced property;
we then know if we then perceive
the presence of that very reason on some definite place,
we already know the conclusion.

The repetition of the deduced conclusion is of no use.*



Dharmakīrti

Indian, born Cudamani? c. 615

**Drop of Reasoning (Nyayabindu)* one of his *Seven Treatises on Valid Cognition*
(Stcherbatsky translation/interpolation/exegesis)

Raised in a Brahmin Hindu family, then turned to Buddhism becoming an ordained monk

Held that only momentary states of consciousness have real existence

Leading master at the great [Nalanda Monastic University](#) (5th– 7th century)

Lived at the apex of Buddhist philosophy, it then being ousted from India by religious zealotry

Forceful in debate; proud and self-reliant, full of contempt for ordinary mankind and sham scholarship

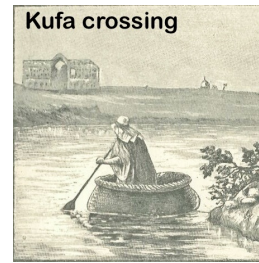
“My work will find no one in this world who would easily grasp its deep sayings.

It will be absorbed and perish in my own person, just as a river in the ocean.”

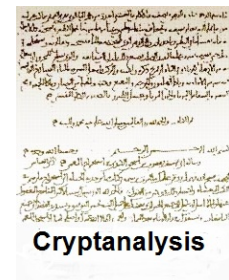
§ In effect, the dictum [“Omni et Nullo”](#)

<http://www.wisdompubs.org/book/scripture-logic-language/introduction>

<http://www.oxfordbibliographies.com/view/document/obo-9780195393521/obo-9780195393521-0085.xml>



translation of [Plotinus](#)



Al-Kindi

Mesopotamean, born Kufa, Iraq, c. 795

**On First Philosophy*

Discourse on the Soul

Still highly revered as “The Philosopher” of the Islamic Golden Age

Compiled, and preserved works of Plato, Aristotle, and others from ancient Greece

Scores of books, mostly lost, but several unearthed in 1949

Works on physics, medicine, chemistry, and psychology

Considered the father of cryptology

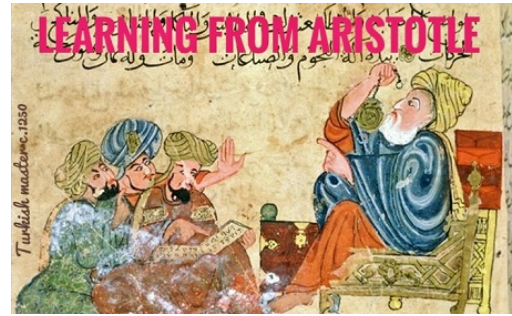
Introduced Indian numerals into Western civilization

Conducted studies on the use of music to soothe the soul

Beset by intellectual rivals; library confiscated, but then returned

Some concepts (truth, being, necessity)
cannot be clarified beyond the clarity
of the concepts themselves.

For all other concepts,
logic is the science of the methods
by which we acquire them.*

[illegible]

Aristotle translation

Al-Farabi

Eastern Mediterranean, born Farab, Persia, 870

**The Enumeration of the Sciences*

Commentary on Aristotle's Logic, Short Treatise on Logic

The Book of Religion, The Book of Music, Meaning of the Intellect

Prominent scholar in virtually all contemporary learning

Taught that rationality in all matters is the path to happiness

Argued that logic, philosophy, and spirituality are the prerequisites of state office

A skilled musician whose tone system remains basic to most Arabian melodies

Proposed music therapy and likely made the first qanoon zither

Said to have been fluent in several dozen languages

Logic is the science of the forms of thinking that are valid and the forms that are invalid....

The logician reflects on the prior principles that are appropriate for the sought objects, one by one, and how these principles lead the inquirer to the unknown object sought.

Thus the logician must do his best to know the principles of the explanatory phrase and the manner of its composition, be that in the form of a definition or otherwise, and to know the principles of proof and the manner of its composition, be that in the form of a syllogism or otherwise.*

The universal quantifier signifies the universality of the judgment with respect to the subject, not to the predicate.

For even though the predicate is universal, the quantifier does not signify that the relation is to its universality, but rather that the relation is to the universality of the subject.

So that if you say: 'Every man is animal', you do not mean that animal in its universality belongs to man,

but rather that animal belongs to the universality of man.**§



Avicenna (Ibn Sina)

Persian, born Bukara, 980

**Remarks and Admonitions on Logic*

*** The Cure (Part Three)*

Theology, The Soul, The Book of Salvation

One of the foremost philosophers in the Hellenistic Islamic tradition

Traveled widely but settled in Isfahan

Influenced European medieval philosophy

Revered physician; medical texts becoming standard in Europe for 400 years

Stressed that all reality has logical design, so all knowledge is grounded in logic

Logic being crucial to human development

First to delineate the biconditional

Insisted on a close relation between logic and understanding God

Hounded by clerical extremists

Imprisoned for being on the wrong side in a Sultonic power struggle

Lunar crater named for him

Logic is the study of the methods of proofs, of syllogisms, of the conditions governing the premises of apodeictic demonstration of how these premises are to be combined, of the requisites for a sound definition, and of how the latter is to be drawn up.

Knowledge is either a concept, and the way to know it is definition, or it is an assent, and the way to know it is apodeictic demonstration.

There is nothing in this which must be rejected..*

For example:

All worms are animals.

All animals possess sensory perception.

Thus all worms possess sensory perception.

This is correct because, in saying "All worms are animals," you give a description of the worm, declaring it to be an animal.

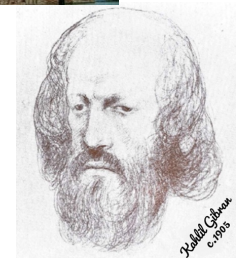
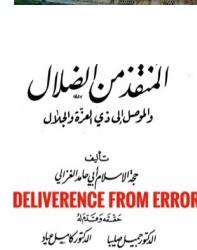
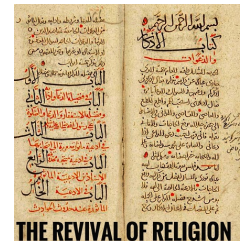
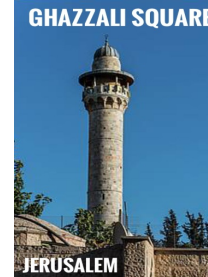
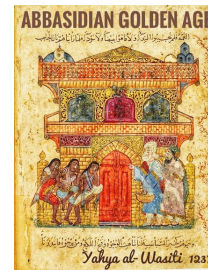
Its attribute is "animal".

Thus, when you judge that animals possess sensory perception, or have bodies, or whatever else, you without question place the worm in this category.

This must necessarily be so, and there cannot be any doubt about it.

Yes, indeed, but the condition for this· is that the attribute must be equal to or more general than the subject so described,

so that the judgment expressed encompasses it of necessity.**§



Al-Ghazzali

Abbasidian/Iranian/Persian, born Tus, Khorasan 1058

* *Deliverence From Error*; ** *The Just Balance*

Incoherence of the Philosophers; *The Revival of Religion*

Lectured in Bagdad on logic, theology, spiritualism, and law

Teachings still central to orthodox Sunni Islam

Leading figure in the Golden Age of eastern intellectual history

Said that the first teachers of logic are Allah, the angel Gabriel, and Muhammad

Used Aristotelian logic to reject all rational philosophy

Held that experience cannot detect laws of nature or causation

Instead, all events are solely by the direct will of Allah

Thus stood in stark contrast to Al-Farabi, Avicenna, and Averroes

Was an occasionalist of the highest order

Had five daughters, by the will of Allah

§ The syllogism rule of Distributed Middle Term

<http://www.muslimphilosophy.com/ip/rep/H028.htm>

If teleological study of the world is philosophy,
and if the Law commands such a study,
then the Law commands philosophy.

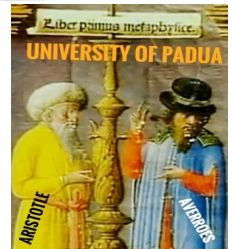
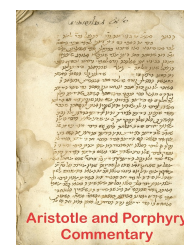
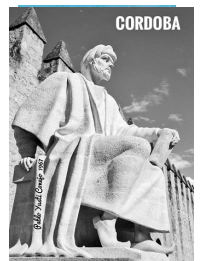
....

To master this instrument the religious thinker
must make a preliminary study of **logic**,
just as the lawyer must study legal reasoning.

This is no more heretical in the one case
than in the other.

And **logic** must be learned from the ancient masters,
regardless of the fact that they were not Muslims.*

There is no other way to learn the truth
than through **logic**.**



Averroes (Ibn Rushd)

Moor, born Cordoba Califate, 1126

**On The Harmony of Religion and Philosophy*

***Incoherence of the Incoherence* – an important step in the revival of learning

Colliget (large and remarkable treatise on medicine; a major advance worldwide)

Commentaries on Aristotle's *Logic, Physics, Animals, Ethics, Astronomy, The Soul*, and more

A prolific scholar

Largely credited with preserving and transmitting the wisdom of ancient Greece

Challenged and refined Ptolemaic astronomy

Devout Islamic theologian, dedicated to reconciling Faith and Reason

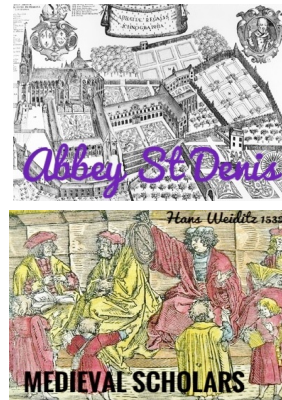
Judge and physician for most of his life

Lunar crater named for him

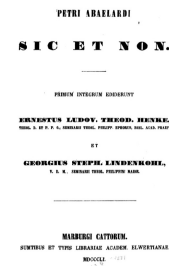
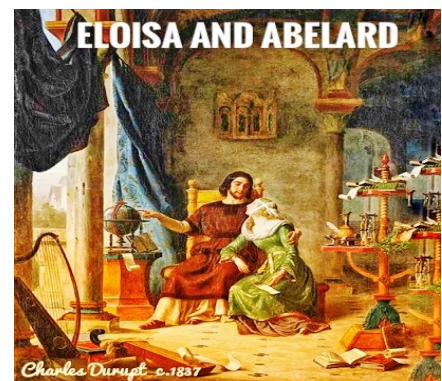
Logic is not the knowledge
of the use nor construction of arguments,
but rather the knowledge
of discerning and judging them correctly,
namely why some are valid and some are invalid.*

Logic has made me hated by the world.**

Through doubting we come to questioning
and through questions we perceive the truth.***



Paris



Peter Abelard

French, born Le Pallet, Brittany, 1079

**Logic in Response to the Request of our Comrades*

***Letters, Heloisa and Abelard*

****Sic et Non (Yes and No)*

Logic for Beginners

Theology of the Highest Good, Christian Theology

Dialogue of a Philosopher with a Jew and a Christian; Ethics, Know Thyself, The Story Of My Misfortunes

Leading figure in the revival of learning in early medieval Europe

A lay monk and abbot scholar, never an ordained cleric

Propounded ideas contrary to the established authorities

Judged a heretic for his theological teachings, especially regarding the Trinity, his books burned and Indexed

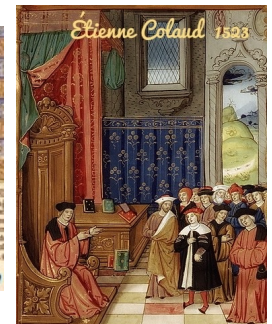
Transferred to the Abbey St. Denis (above) and other monasteries for the rest of his life

Best known forever since by the shared love of Heloisa and Abelard, resulting in his being castrated

The vital spirit of animals constitutes the source
of their organic structure and vegetative processes.
It regulates and quickens the humors
necessary for their animate life,
although it originally took birth from those same humors.
With its subtle energy it vivifies and systematizes large matter
according to its own form,
except so far as it may be hindered by poisonous bodies.
In almost the same way, **logic** has come into existence
as a consequence of other studies,
and these it subsequently organizes and vivifies,
except so far as it may be deterred
by noxious impediments and ignorance.

....

Just as **logic** expedites other studies,
so, if left alone by itself, lies powerless and sterile.
For if it is to fecundate the soul
to bear the fruits of knowledge,
logic must conceive from an external source.*



John of Salisbury

Anglo-Saxon, born Old Salisbury, 1120

**Metalogicon* (standard text for several centuries)

Politracticus (primary opus for medieval political theory)

Both written when secretary to Thomas à Becket at Canterbury

Early studied with leading scholars at Chartres and Paris

An eloquent statement of logic's place in learning

Large personal library provides an illuminating depiction of medieval culture

Philosopher, historian, churchman, diplomat, and scholar

Reportedly (??) witnessed the murder of Becket ----->

Then bishop of Chartres

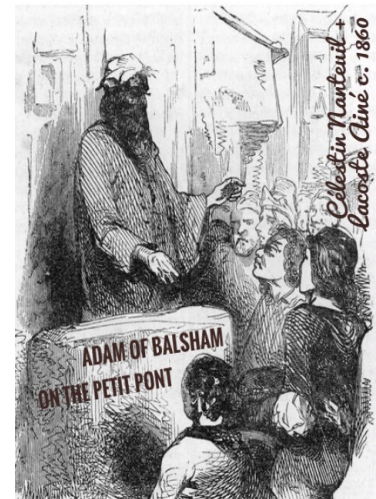
<http://www.bartleby.com/211/1002.html>



After teaching the first principles of **logic**
to William of Soissons,
I sent him on to my friend
Adam of the Petit Pont [Adam of Balsham].
Perhaps it was there that he learned that the
same conclusion may be inferred from a pair of contradictories.
But even by the reasoning devised by a friend
could I be brought to believe
that because one thing is inconceivable,
all things become inconceivable.

John of Salisbury, *Metalogicon*

I wonder that certain men
oppose the thesis that from a per se impossibility
anything whatsoever follows... For doesn't it follow
that if Socrates is a man and not a man,
then Socrates is a man, but if Socrates is a man,
then Socrates is man or a stone?
Therefore, if Socrates is a man and not a man,
then Socrates is a man or a stone.
But if Socrates is a man and Socrates is not a man,
then Socrates is not a man.
Therefore, if Socrates is a man and Socrates is not a man,
then Socrates is a stone.**¹



The Parvipontani
(Those of the little bridge)

Paris, France, early 12th century

“The Petit Pont is appropriated by the dialecticians discussing grave matters.” Gui de Bascoches (c.1150)

Led by Adam of Balsham, *The Art of Disputation*

Notable members:

Alexander Neckham, *****On the Nature of Things*** (1190)

Prolific writer on theology, Aristotle, sermons, scripture...more

Translated Aesop's fables from Greek prose to Latin elegiac verse

William of Soissons

No known texts, if there were any

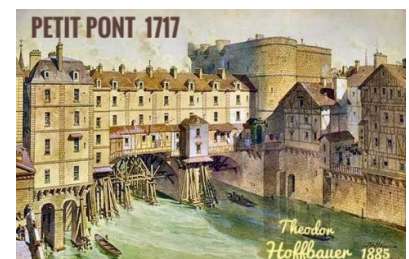
A sharp mind and subtle nature, but difficulty speaking

(acc. William of Tyre, medieval chronicler)

¹ This tautology (later termed The Law of Explosion) emerges from the Parvipontani:

A single contradiction implies any proposition whatsoever.

20th century symbolic logic proof by C. I. Lewis, [see proof here](#)



As for **logic**, the ancient thinkers do not count it among the sciences, but rather as an instrument to science.

Indeed it has been said:

One cannot properly study or teach except by means of the art of **logic**; for it is an instrument,

and an instrument of something is not a part thereof.

....

A man, when he commences to speculate, ought not to embark at once

on a subject so vast and important;

he should previously adapt himself to the study of the several branches of science and knowledge, should most thoroughly refine his moral character

and subdue his passions and desires,

the offspring of his imagination;

when, in addition, he has obtained a knowledge

of the true fundamental propositions,

a comprehension of the several methods

of inference and proof [**logic**],

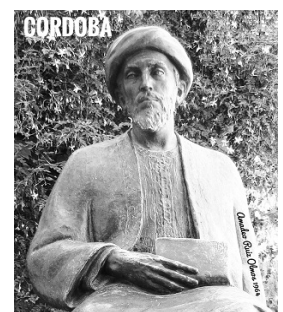
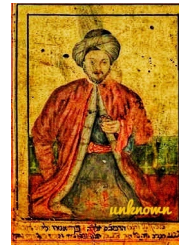
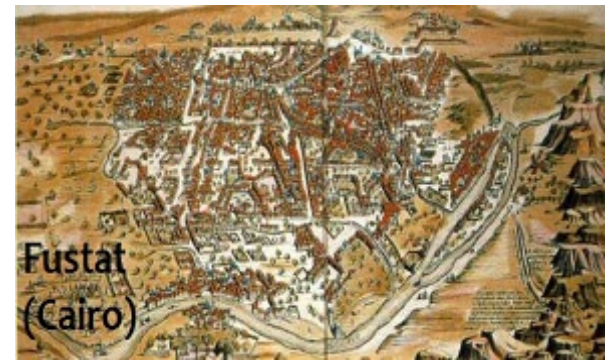
and the capacity of guarding against fallacies,

then he may approach the investigation of the subject.*

Consequently,

one who wishes to attain human perfection

must first study **logic**.**



Moses Maimonides

Moor, born Cordoba Califate, 1135

**Treatise on Logic*

***Guide to the Perplexed*

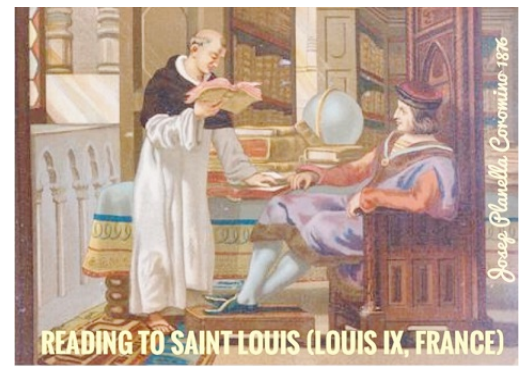
Philosopher, historian, logician, theologian, physician, rabbi

Moved all across the southern Mediterranean, settling in Fustat (Cairo)

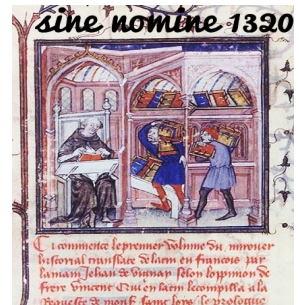
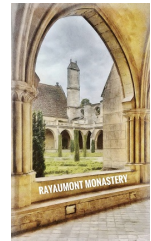
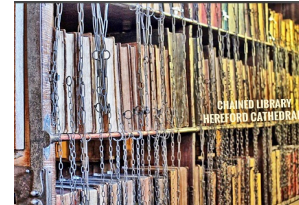
Sought to reconcile science, philosophy, and religion

Stressed a rational approach to Judaism and all religions

Physician/advisor to Muslim royal families



Logic is the science
of arranging presented propositions
in logical figures to draw conclusions
by which to arrive at knowledge of things said,
and to judging whether they are true or false.*§



Vincent of Beauvais

French, born Beauvais (?) c.1190

The Great Mirror (Speculum Maius) predominant encyclopedia for 500 years

* *Mirror of Doctrine* (logic, rhetoric, geometry, astronomy, anatomy, medicine, law,...)

Also the *Mirrors of Nature, History, and Morality* (a remarkable achievement)

The Moral Education of a Prince, The Education of Noble Women

Dominican brother, pursuing a quiet life of research and reflection

Highly respected reader, theologian, and scholar at Rayaumont monastery

Substantially patronized by Saint Louis (King Louis IX)

Lecturer, teacher, and preacher at the royal court

Honorific: Devourer of Books

§ This is easily and widely misinterpreted.

Since logic can tell only whether or not one proposition is entailed by others (cf. [De Morgan](#)).

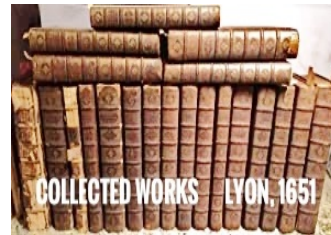
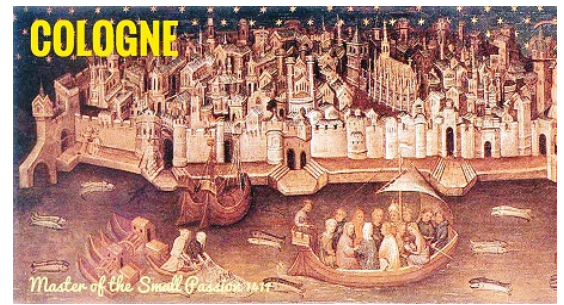
Except within Formal Logic itself and possibly mathematics,
logic alone cannot prove the truth or falsity of any proposition.

Every reasoning used in any discourse comes from **logic** and is a part of **logic**, whether the discourse employs a simple syllogism or a demonstrative, dialectical, or even sophistical syllogism. Therefore **logic** is not covered completely until every mode and kind of discourse has been treated in it.

The Dialectical Syllogism proceeds from probables, in proper syllogistic consequence and often has some measure of conjecture or invention.

The usefulness of dialectic **logic** is to inform and perfect the reason with intellectual instruments and turn it to the externals of the things to be known.§*

§ E.g., to empirical science, for which Albert the Great is most notable



Saint Albert the Great
(Albertus Magnus)

Bavarian, born Lauingen, c.1200

**Topica*, *Astronomy*, *Law*, *Plants*, *Music*, *Ethics*, *Music*, *Geometry*, *Animals*, *Love*, *Theology*,...more

Collected works fill 38 volumes

In 1223, pursuant to advice from the Blessed Mother, became a Dominican

First to gather all of Aristotle, with paraphrase, added material, and commentary

Benefitted from Arab sources--[Avicenna](#) and [Averroes](#)

Professor of Theology in Paris and founder of the University of Cologne (above)

Works encompass virtually the entire body of European knowledge at the time

A truly major compendium and advance in the history of science

Demonstrated that the Earth is a sphere and discovered the element arsenic

**"Science does not consist simply in believing what we are told,
but in inquiring into the nature of things."** (*On Minerals*)

Bishop of Regensburg and assigned to preach the Crusades throughout Germany

Recast theology in an Aristotelian framework, while retaining important aspects of neo-Platonism

This given ever-lasting formulation by his student [Thomas Aquinas](#)

Beatified 1622, Canonized 1931, proclaimed Doctor of the Church

Patron saint of scientists and the only Roman Catholic denominated "The Great"

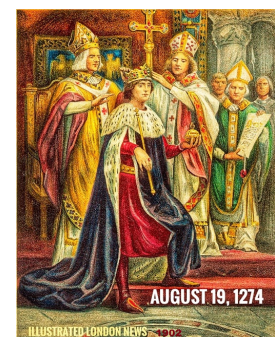
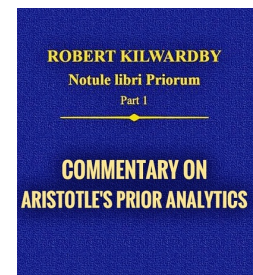
Typeface, plant species, and asteroid named for him

Refrained from riding horseback, preferring to walk

<http://www.newadvent.org/cathen/01264a.htm>

<http://mathshistory.st-andrews.ac.uk/Biographies/Albertus.html>

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Robert Kilwardby
(crowning England's Edward I)

English, born Leicestershire or Yorkshire, c.1215

*Commentary on Aristotle's *Prior Analytics*

Commentaries on the entire *Organon* (widely circulated throughout Europe)

On the Imagination; On Time; Questions over Ethics The Birth of the Sciences (a major work)

Prodigious output, some not yet properly edited, some still unrecovered

From Dominican friar to Archbishop of Canterbury and Cardinal Bishop of Porto and Santa Rufina

Major contributor to the early and continued prominence of Merton College, Oxford

Largely Augustinian in theology; Left the Canterbury See deep in debt

Thus by opposing Aquinas in certain matters, was forbidden to teach on such matters

Grave site at S. Maria Gradi, Italy heavily damaged amidst wartime bombing

TOC

Logic is the art with which the logician discovers the natural connection between subject and predicate, which is a middle term that leads to necessary conclusions.

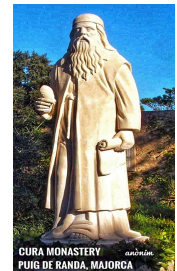
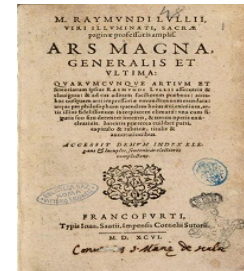
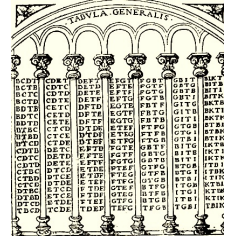
....

Logic is a difficult art to learn, whereas the general arts[§] are easier. This is why one can learn more of a general art in one month than a logician can learn of **logic** in a year.*

Rhetoric moves a prince to show compassion, but **logic** moves a prince to enforce justice.**

[§]Goodness, Greatness, Eternity, Power, Wisdom, Will, Virtue, Truth, Glory, Difference, Concordance, Contrariety, Beginning, Middle, End, Majority, Equality, and Minority

Regarding logic vs/ rhetoric also see [Seville](#), [Bacon](#), and [Hobbes](#).



Ramon Llull

Catalan, born Majorca, 1232

**Ars Magna*

***Tree of Science*

Ars Eleccionis; *Book of Propositions*; *The Art of Demonstration*; *Blanquerna* (an early novel form)

Lifelong student of the occult sciences and an acclaimed alchemist (above)

His primary mission: convert Muslims and Jews to Christianity using logical schemes

Sought a semi-mechanical device to facilitate conversion and learning

Contrived fantastic graphs, overlapping calculator cards, matrices, geometric designs

Invented consensus voting plan, MS found in year 2001, but “reinvented” by [Nicholas Condorcet](#)

Now regarded as the first to add relational predicates to Aristotle’s syllogistic

Constructed a *Tabula Generalis* (above) anticipating truth tables and binary logic

Arguably a first step toward calculators, input/output devices, even computers (see “digital” scroll above)

First ever conversion missionary to Muslim North Africa

To learn Arabic, bought an arab slave who rebelled who killed himself

Translated [Averroes](#) commentaries into Latin and Catalan

Several extended missions, possibly martyred in Tunis

For sure wrote 265 works, possibly 400

http://quiseestlullus.narpan.net/eng/index_eng.html

<http://history-computer.com/Dreamers/Llull.html>

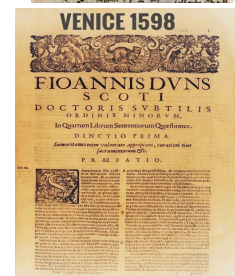
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No part of **logic** is about an utterance,
since all effects of a syllogism and all its parts can exist in it,
according to the existence that they have in the mind,
even if they are not uttered, as is satisfyingly clear.

Rather it is about something prior,
which in respect of the signifying utterance
has only an account of what is signified.

...

One must say that **logic** is a science,
since the things taught in **logic** are conclusions
on the basis of demonstrations,
as is the case [only] in the sciences. Therefore, they are
objects of scientific knowledge.*§



Duns Scotus

Scottish, born Duns, Berwickshire, 1266

**Questions on Porphyry's Isagoge: Is Logic a Science?*

Ordination, A Treatise on God as First Principle

The Metaphysics, God and Creatures, General Issues

Franciscan friar and ordained priest

A truly outstanding scholar and so named "The Subtle Doctor" by the King of Spain

Studied long and hard at Oxford before his many years as Master at the University of Paris

Highly original and magnificently crafted works in theology, logic, and philosophy

Forced to flee France by his opposition to King Philip's taxation of Church property

Moved to Germany, compiled major studies, but died within two years at age 43

Beatified by Pope John Paul II, 686 years after his death

Emerging during the Renaissance as the personification of "hair-splitting"

The Duns Cap (dunce/fools cap) evolved in the revolt against Medieval style and substance.

Gravestone: **"Scotland bore me, England received me, France taught me, Cologne holds me"**

§ It is important to bear in mind that in these times, prior to Copernicus, Galileo, and Newton, science ('scientia') was completely a priori (independent of experience and observation). Such things as experimentation and theory (in so far as they existed at all!) were simply **nonscientia**.

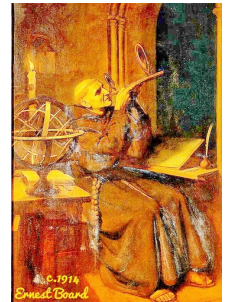
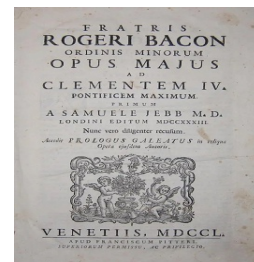
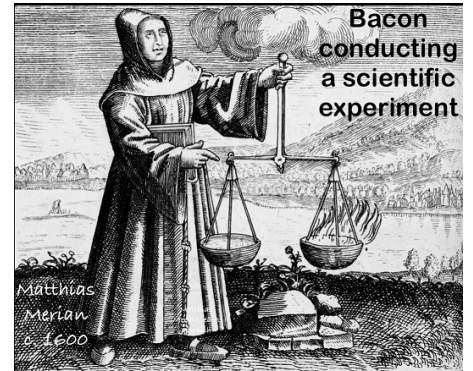
TOC

Logic draws a conclusion
and makes us grant the conclusion
but does not make the conclusion certain,
except through experience.....

Our knowledge of the science of **logic**
is derived from nature,
but we are ignorant

of the proper terms at the beginning.
These through their zeal for discovery
the first authors on **logic** have found,
but we learn them by study.

By way of these terms
the formal subject of **logic** exists,
not be because of the potency of the science itself,
but because this is innate in everyone.*



Roger Bacon

English, born Ilchester, Somerset, 1214

**Major Work*

Comprehensive Logic, Minor Work

Comprehensive Reason and Dialogue

Franciscan friar and lecturer at Oxford and Paris

Ostracized by university and church hierarchy

Forced into life as an independent scholar

Then given full permission to write and publish by Pope Clement IV

Produced enormous volumes

Invented the magnifying lens and experimented in optics

Worked with gunpowder and was instrumental in its use in the West

Stressed that all the sciences depend on mathematics

Accused of and imprisoned for promoting demonic ideas

Released, only to die in obscurity

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705416/>

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Now reason is not only able to direct
the acts of the lower powers
but is also director of its own act:
for what is peculiar to the intellective part of man
is its ability to reflect upon itself.

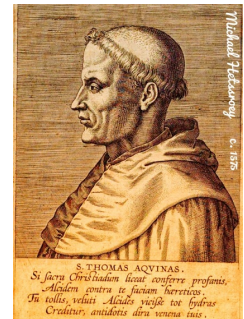
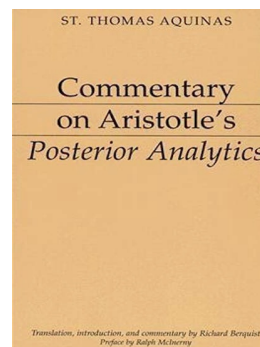
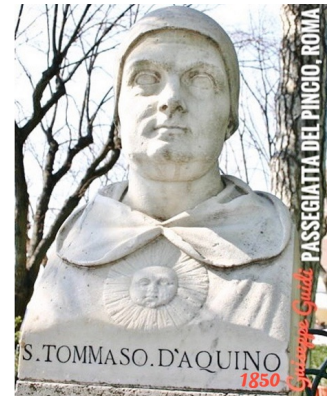
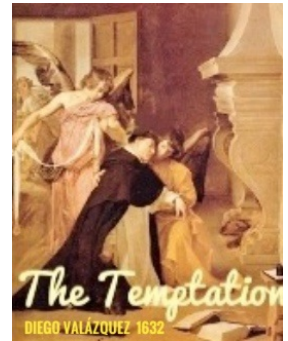
For the intellect knows itself.
In like manner reason is able to reason
about its own act.

Therefore just as the art of building or carpentering,
through which man is enabled to perform manual acts
in an easy and orderly manner,
arose from the fact that
reason reasoned about manual acts,
so in like manner an art is needed
to direct the act of reasoning, so that by it
a man when performing the act of reasoning
might proceed in an orderly and easy manner
and without error.

And this art is **logic**, i.e., the science of reason.

And it concerns reason
not only because it is according to reason,
for that is common to all arts, but also because
it is concerned with the very act of reasoning
as with its proper matter.

Therefore it seems to be the art of the arts,
because it directs us in the act of reasoning,
from which all arts proceed.*



Saint Thomas Aquinas

Italian, born Roccasecca Kingdom of Sicily, Lazio, 1225

**Commentary on the Posterior Analytics of Aristotle*

Summa Theologica, Summa Contra Gentiles

His family so appalled at the prospect of his becoming a Dominican,

Had him imprisoned for two years in Monte San Giovanni Castle (above)

Even sent an impure woman to tempt him, unsuccessfully, so we are told (above)

While in prison, received the finest education possible

Canonized just 49 years after death, thenceforth his theology highly influential

Always wrote Latin with a "littera inintelligibilis" (unintelligible lettering), decoded 500 years later

Called on unique scribes to transliterate into ordinary Latin manuscripts

Highly honored by successive Popes, made **"Patron of all Catholic Universities World Wide"**

In 1879 proclaimed the virtually unchallenged authority in Catholic theology

<http://www.logicmuseum.com/authors/aquinas/perihermenias/aquinas-periherm-index.htm>

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TOC

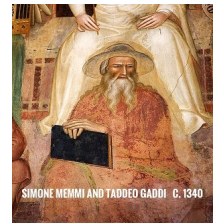
Logic is the art of arts, science of sciences,
having the way to the principles of all methods;
for in fact dialectic alone credibly argues
about the principles of all other sciences,
and therefore in the learning of all other sciences
logic must be prior.*

A formal consequence is one that holds
in the case of all exactly similar terms,
the form of arguing
in the exactly similar manner having been retained....
And I am saying something
worth knowing in this definition,
because there are many formal consequences
which do not hold
just in the case of “exactly similar terms”.
An example is “A man is an animal; an ass is a animal.
Therefore a man is an ass”.**§

§ see similar by [Whately](#) and by [Jevons](#)



Dante's *Paradiso*
by Giovanni di Paolo c. 1445



Peter of Spain

Iberian, born c. 1200

**Summulae Logicales Magistri Petri Hispani* (standard textbook for over 700 years)

***Treatise on Consequences* (appended to *Summulae*, authorship uncertain)

Thesaurus Pauperum (extensive medical remedies, standard for 400 years)

Identity still unresolved, here taken as the Dominican Petrus Ferrandi Hispanus

Sadly nothing known about his life

Long thought to be the Pedro Julião who became the only Portuguese Pope—John XXI

Also possibly a Cambridge Blackfriar

Likely first to hold that *petitio principii* (that is, circular reasoning)
is not a fallacy of inference, only a fallacy of proof.

In Dante's *Paradiso* (see above painting) St. Bonaventura says:

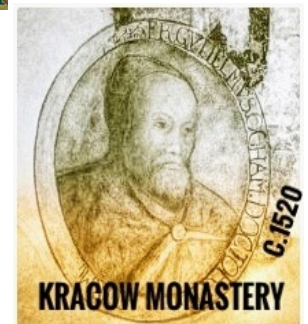
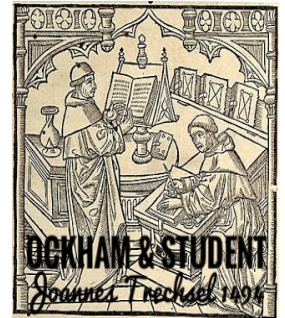
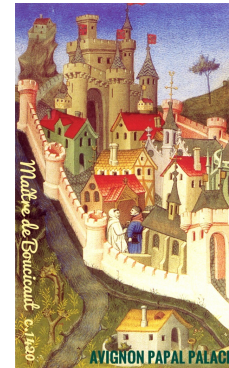
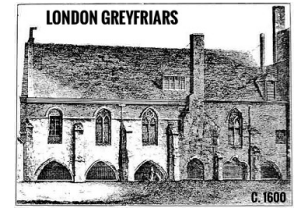
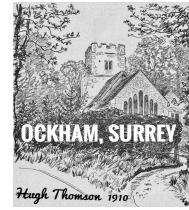
**“Illuminato and Augustine are here;...
Peter of Spain, who with his twelve books,
glows on earth below...”**

TOC

For **logic** is the most useful tool of all the arts.
Without it no science can be fully known.

It is not worn out by repeated use
after the manner of material tools,
but rather admits of continual growth
through the diligent exercise
of any other science.

For just as a mechanic
who lacks a complete knowledge of his tool
gains a fuller knowledge by using it,
so one who is educated
in the firm principles of **logic**
while he painstakingly devotes his labor
to the other sciences,
acquires at the same time a greater skill at this art.*



William of Ockham

English, born Ockham, Surrey, 1285

**Summa Logicae*

A Franciscan Friar

Among the most highly regarded scholars of the late middle ages

Best known for Ockham's Razor: "For an explanation, use no more hypotheses than necessary."

Argued (contra [Burley](#)) that logical forms are simply abstractions and have no reality in themselves

Studied and lectured at the renowned London Greyfriars monastery (above)

Theological teachings considered so heretical that Papal authority confined him in a monastery

Spent much of his adult life in France and Germany seeking freedom to think and write

Declared Pope John XXII a heretic for opposing Apostolic Poverty

Held in the Avignon Papacy to be severely sanctioned by the Curia

Fled Avignon only to be excommunicated and live the rest of his life hiding

Spent much of the remainder of his life amongst a band of fugitives

Honorifics: Invincible Doctor, Venerable Preceptor, Singular Doctor, Unparalleled Doctor!

<http://www.bbc.co.uk/programmes/b007m0w4>

FIND STAINED GLASS

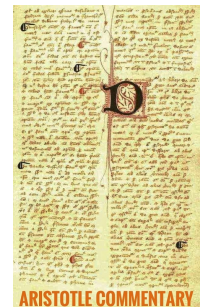
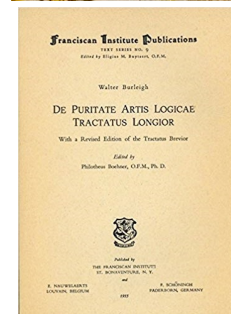
I propose to compile, if God grants it,
a kind of treatise on the purity of the art of **logic**,
so that youths who are arguing about any problem at all
can be trained and can quickly dispose of it.

..

The first rule of inference is this:

In every good simple inference,
the antecedent cannot be true without the consequent.
So if in some possible case, the antecedent could be true
without the consequent,
then the inference was not a good one.....

The second rule is that whatever follows from the consequent
follows from the antecedent.*



Walter of Burley
(no known representation)

Scottish, born Burley-in-Wharfedale, Yorkshire, 1275

**On The Purity of The Art of Logic* (widely studied at the time)

On Suppositions, On The Soul's Faculties

Treatise on Forms, Metaphysics

Commentaries on Aristotle's *Physics, Logic, The Soul, Politics, Animals, Motion, Ethics*

Secular Franciscan

Known as the “Plain and Perspicuous Doctor”

Master of Theology at the Sorbonne, Paris

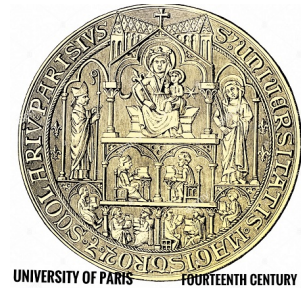
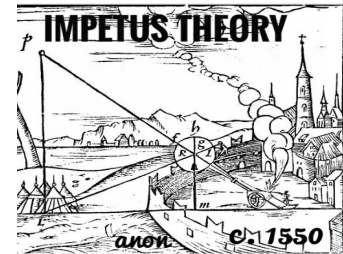
Scholar, diplomat, envoy to the Pope in Avignon

Argued (contra [William of Ockham](#)) that logical forms have a reality apart from our thoughts

Author of more than 50 works

Imprisoned, briefly, regarding the illegal felling of two trees in Sherwood Forest

Logic in one way
infers the conclusion
from the premises
and in another way
it proves the conclusion
by means of the premises.*



John Buridan

French, born Béthune, 1295

**Questions in Porphyry's Isagoge*

Summa de Dialectica , *Compendium of Logic*

Treatise on Consequences, Commentaries on Aristotle's *Organon* and *Physics*

Major achievements in logic only to be rediscovered 500 years later

University of Paris professor from age 20 until death

A secular cleric, not ordained

Argued forcefully against the extra-mental existence of universals, e.g. Whiteness, Beauty,....

Using experiments, refined the Impetus Theory of Motion, an advance on the road to Newton

Unlike most scholars then (and since!), was well supported by patrons and students

Books banned by King Louis XI

Eponym of Buridan's Ass paradox (above)

As a youth in a boyish scuffle, slapped the future Pope Clement VI

TOC

Provided we assume rules of **logic**, it can be proved that from something impossible anything follows.

It can be argued as follows:

From Socrates exists and Socrates does not exist,
it follows: Socrates exists.

From this it follows: Socrates exists or man is a donkey.

Also from Socrates exists and Socrates does not exist,
it follows: Socrates does not exist. Behold, therefore,
how from Socrates exists and Socrates does not exist, it follows:
Socrates exists or man is a donkey, and Socrates does not exist.

But from this it follows: Man is a donkey.

In a similar manner it can be proved in regard to anything.

.....

When it is said that **logic** is not acquired by **logic**,

I say no, on the contrary,

logic which is knowledge is acquired
through **logic** which is not knowledge;
namely, that which is called

‘the apprehension of logical first principles’,
which is not called ‘knowledge’ but ‘comprehension’.

Therefore, it is correctly conceded:

‘all knowledge is acquired through **logic**,’

but not always through **logic** which is knowledge.

Hence, from the apprehension of logical first principles,
which **logic** but not knowledge,

is produced an apprehension

of a conclusion whose apprehension is knowledge.

Comprehended in this way, I correctly concede
that **logic** which is knowledge is produced from **logic**
which is not knowledge.*



Albert of Saxony
(No known representation)

German, born Rickensdorf, Helmstadt, 1320

**Sophismsata*

Very Useful Logic, Disputed Questions on Logic

Question-Commentary on Aristotle's Physics and Heavens

Leading Master at the University of Paris; first Rector of the University of Vienna

Papal diplomat and Bishop of Halberstadt

Reformulated and solved(?) the “**Liar Paradox**”:

THE FOLLOWING SENTENCE IS TRUE. THE PREVIOUS SENTENCE IS FALSE.

The question being: Which sentence is true, and which is false? **GOOD LUCK!**

Groundbreaking (though false) explanation of the path of projectiles and planetary motion

Knowledgeable in mathematics and wrote on the possibility of squaring the circle

Theories presaged the new astronomy of Copernicus and Kepler

Committed to the wrong side, was captured in the Lüneburg War of Succession, but released unharmed

Possibly a satirical allusion in Chaucer: *The Reeve's Tale*

<https://enacademic.com/dic.nsf/enwiki/427431>

There are postulates [of **logic**].
 Conjunctions and disjunctions
 with mutually contradictory parts
 contradict each other.
 From any disjunction
 together with the opposite of one of its parts
 the other part is inferred.
 If a conjunction is true,
 each part of it is true and conversely;
 and if it is false,
 one of its parts is false and conversely.
 And if a disjunction is true,
 one of its parts is true and conversely;
 and if it false, each part is false and conversely.*§

§ Note the parallel to [Chrysippus](#), 3rd century B.C.



Thomas Bradwardine

English, born Sussex, 1290

**Insolubles*, chap. VI (in his remarkable treatise on the [Liar Paradox](#))

On 'It Begins' and 'It Ceases', *Speculative Geometry and Arithmetic*

On the Continuum; On Future Contingents; Ratio of Speeds in Motion; On Acquiring a Trained Memory

From Chaucer's "Nun's Priest's Tale":

"But I cannot sift the wheat from the chaff, as can the holy doctor Augustine or Boethius or Bishop Bradwardine whether God's glorious foreknowledge compels me by necessity to do a thing (by necessity I mean absolute necessity), or if I am granted free choice to do or not that same thing, though God foreknew it long before; or whether His knowing does not constrains at all except by a conditional necessity. With such matters I will not concern myself."

Secular cleric, came to be recognized as *Doctor Profundus*

Argued for Determinism and that it is compatible with both Free Will and Divine Omniscience

Profound student and Fellow of Balliol College, Oxford, then of Merton College.

Later Chancellor of St. Paul's, London.

Confessor of King Edward III and his warfare-related diplomat

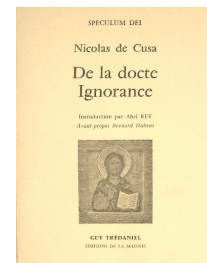
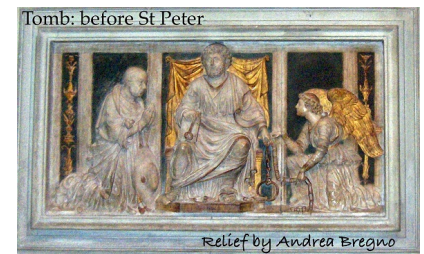
Notable advances in mathematics and physics

After much church/state dispute, installed Archbishop of Canterbury, but died of the plague within seven weeks.

[http://www.u.arizona.edu/~aversa/scholastic/Dictionary%20of%20Scientific%20Biography/07.%20Bradwardine%20b.%20ca.%201290%20\(Murdoch\).pdf](http://www.u.arizona.edu/~aversa/scholastic/Dictionary%20of%20Scientific%20Biography/07.%20Bradwardine%20b.%20ca.%201290%20(Murdoch).pdf)

READ TOMBSTONE INSCRIPTION

Logic enfolds and unfolds
the power of reason.
Yet, too much of **logic**
can be injurious,
rather than beneficial.*



Nicholas of Cusa

German, born Bernkastel-Kues, 1401

**Defense of Learned Ignorance*

On Learned Ignorance, On The Summit of Contemplation, Wisdom and Knowledge

Metaphysical Speculations, Contemplation and Theology, Dialogue on the Hidden God

On Universal Concord, On Seeking God, On the Vision of God

Cardinal, humanist, theologian, philosopher, diplomat, lawyer, mathematician, astronomer, historian

Figured prominently in the transition from the Middle Ages to the Renaissance

A major contributor to the rebirth of learning and the ennoblement of the human spirit

As did [Cicero](#), long before [Copernicus](#), held that Earth revolves on its axis and around the sun

Anticipated the infinitesimal, later developed into the calculus by [Isaac Newton](#)

Adumbrated ideas only fully developed nearly 500 years later in Einstein's relativity theory

Oft controversial views tolerated by a still then (but not for long) open minded Vatican

Invented concave lenses for nearsightedness, advocated consensus voting (see [Condorset](#))

Heart lies in the chapel altar in a still functioning hospice he bequeathed (see above)

<http://www.keplersdiscovery.com/Cusanus.html>

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If in a solid [**logically** valid] inference
the antecedent is true,
the consequents also is true;
for although the true can follow from the false,
from the true none other than the true follows.

....

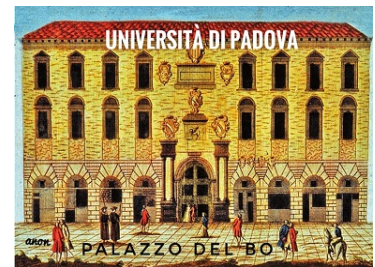
From this rule two corollaries follow:

First, in a solid inference,
if the consequent is false,
the antecedent is likewise false.

Second, if in an inference
the antecedent is true and the consequent is false
the inference is not solid.

....

An inference is solid
where the antecedent is impossible
or the consequent is necessary.*



Paul of Venice

Italian, born Udine, 1368

**The Small Logic*

The Great Logic; Golden Sophisms

Summa of Natural Philosophy; Commentaries on Aristotle

Joined the Augustinian order at the age of fourteen

Doctor of Arts and Theology

Lectured at Oxford, Venice, Padua, Siena, Perugia, and Bologna

Upheld and extended the science of logic amid hostile Humanism and the Renaissance

Served as ambassador of the Venetian Republic to Poland

Was expelled from Venice because of his activity in a political conspiracy

Died while lecturing on Aristotle

http://www.encyclopedia.com/topic/Paul_of_Venice.aspx

All proof arises by true things
which are certain,
and through these things
logic makes other things,
which were previously uncertain,
appear certain.

,...

The syllogism has three components:
the first that proves, a second that is given,
and another that follows.

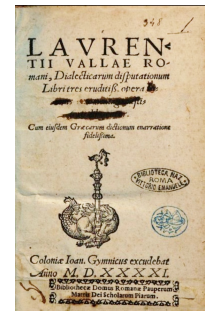
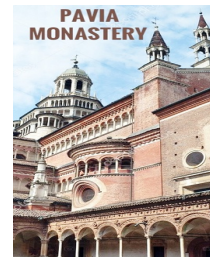
The first two supply the matter
the way that flour and water are the matter
when we make bread,

but not without the help of the hand
which kneads them into dough.

Like the hand, the conclusion
is the blending the previous two sentences.*



Via Francigena near Pavia



in Ferdinando Ranalli, 1838
THE LIVES OF ILLUSTRIOUS ROMANS

Lorenzo Valla

Italian, born Piacenza, 1406

**Retrenching Dialectic and Philosophy*

Elegances of the Latin Language, The Donation of Constantine, Annotations on the New Testament

Leading figure in Renaissance Humanism and the revival of classical learning and style

Professor of Eloquence at the University of Pavia

Rejected contemporary jurisprudence, it being based on medieval rubrics

Tenacious and highly controversial, but protected and supported by the kingdoms of Aragon, Sicily, and Naples

Strongly dismissive of Aristotelian logic and Scholastic pedantry

Discredited Roman emperor Constantine's authorizing Papal temporal rule in western Christianity

Argued that reason, instinct, desire, longing, preference, and pleasure are blessings from God

Held that by departing from common language, theology and philosophy tend beyond our understanding

Rejected the Inquisition and did not believe in The Apostles' Creed

Thereby was endangered and branded an outcast and nonbeliever

Sentenced to be burned at the stake, but reprieved by King Alfonso

Then restored by and became Papal secretary to Nicholas V, himself a Renaissance advocate

Compiled the still standard Latin Vulgate translation of the Bible from Greek

Inspired subsequent vernacular Bibles across Europe

Praised by Protestants for his critiques of Catholic texts

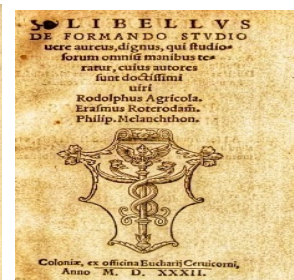
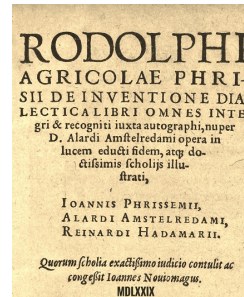
Never married, but had three children by his mistress in Rome

In successful discourse,
reason and orderly expression
in the subject matter
must be present.

These are secured by **logic**.

Therefore, **logic** is part of style,
in which perspicacity of argument
outweighs ornament.*

[slightly paraphrased]



Rodolphus Agricola

Dutch, born Baflo, Groningen, Hansiatic League, 1443

**The Invention of Dialectic*

Oration in Praise of Philosophy, Studies in Humanism

On Shaping Studies, Life of Petrarch, The Nativity of Christ

Letters (many to ancient Roman authors, such as Quintilian, Seneca, and Lucretius)

Some Questions about the Universals, On the Universal, the Singular and the One

Time in Pavia and Ferrara absorbing the new Humanism

Exceptional figure in the transition out from the Middle Ages

In Dillingen school to study classics and corresponding with other scholars

An independent scholar though sought by universities

Credited as the progenitor of the Northern Renaissance

Formulated new curricula in education stressing science and the arts

Devised a way to teach the deaf to speak

Remunerated as organist at a royal chapel

Reportedly a sportsman, especially boxing

Contemporary biographies

<https://library.oapen.org/bitstream/handle/20.500.12657/34474/426371.pdf?sequence=1&isAllowed=y>

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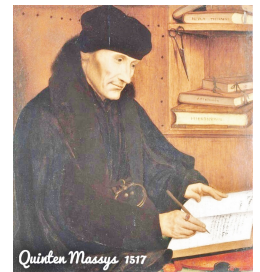
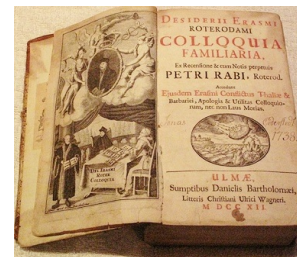
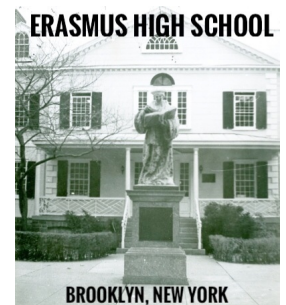
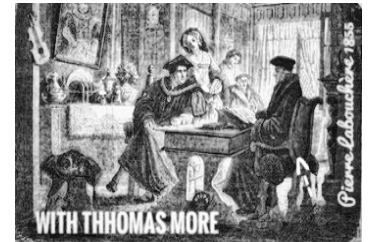
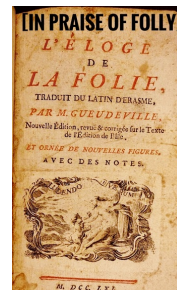
Young men spend a bare three months
on the study of grammar
before being hurried into sophistry and dialectic
with all their suppositions, embellishments,
restrictions, expositions, resolutions, problems,
and intractable questions.....

And a shallow mind will,
in order to parade a thin layer of knowledge before the class,
import wholly unnecessary difficulty into a lesson;
this happens especially in teaching **logic**.

...

Yet with an argument, it is important to know
in what way and by what means
one proposition depends on another,
with how many arguments
each proposition should be supported,
and with how many confirmations....

So I would not have a boy
wholly ignorant of **logical** rules,
but I certainly decline to have him trained
to deliver those preposterous feats
of dialectical juggling and tumbling
that are so much belauded.*



Desiderius Erasmus

Dutch, born Rotterdam, 1466

* "On the Education of Youth"

Adages, *Colloquies* (dozens of essays assailing the failings in western civilization)

In Praise of Folly (a masterpiece satire of literature, culture, and religion)

Definitive Greek/Latin *New Testament*, highly respected and a paradigm for all future Bibles

"Complaint of Peace", "Handbook for a Christian Knight", "Freedom of the Will"

As with most Humanists, had difficulty separating logic from the pedantic misuse of logic

Social critic, teacher, humanist, theologian with enormous writings of lasting importance; master of irony

Lifelong devout Catholic priest, but never served as one, worked with England's humanist Thomas More (above)

Attack on the hypocrisy and excesses of the church of great impact on the course of Christianity and society

Though strongly opposed to Martin Luther, has ever since been regarded as presaging the Reformation

Studied/lectured at Queens' College, Cambridge; University of Leuven, and other universities across Europe

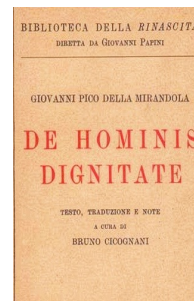
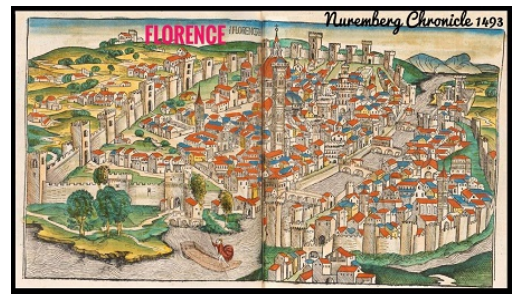
Offered several professorship, but mostly preferred life as an independent scholar

Erasmus Hall high school in Brooklyn, New York (above), founded in 1789; statue unveiled in 1931

https://web.archive.org/web/20150329005119/http://www.ibe.unesco.org/fileadmin/user_upload/archive/publications/ThinkersPdf/erasmuse.PDF

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Logic will calm a mind
torn by anxiety and uncertainty
amid conflicting ideas.
May one therefore by **logic**
wash away ignorance,
thus to purify and prepare the soul
toward final perfection.*



Giovanni Pico della Mirandola

Italian, born Modena, 1463

**Oration on the Dignity of Man*

900 Theses

Strove to reconcile and combine philosophy from antiquity through the middle ages

Arguably the most influential humanist of the era

Set forward an uplifting view of man's place in God's creation

Stressed the importance of empirical science in the quest for knowledge

Greatly influenced by the mysticism of the Jewish Cabala

Argued strongly against astrology

Many years in Florence with the House of Medici

Major work condemned and blocked by Pope Innocent VIII

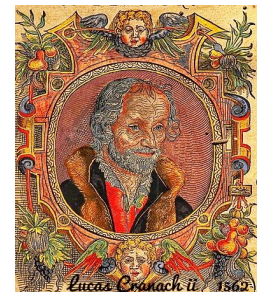
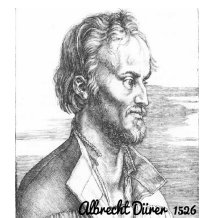
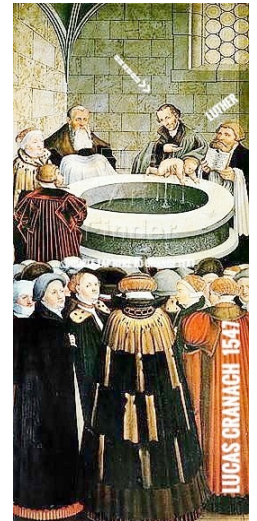
Died from arsenic poisoning, as discovered 550 years later

Papal librarian before age 16

Logic is a plain and a sure way
to instruct us
in the truth of everything.

.....

Of all things the task of **logic**
is the most important one in our church,
for it properly informs our methods,
defines correctly, divines properly,
corrects fittingly, judges,
and separates hideous connections.*



Philip Melanchthon

German, born Bretten, 1497

**The Art or Craft of Rhetoric*

The Augsburg Confession (founding theology of the Protestant Reformation)

Theses on Law, Gospel & Faith

Commentaries on *Romans* and *Colossians* (highly influential)

Alongside Martin Luther, the primary founder of the Protestant Reformation

Scores of works in theology and education

Virtually originated and then implemented public schools throughout Germany

Devised the very first programs of teacher education

In countless public debates, though slight in body and strength, fiercely opposed Catholicism

With his wife Katherine, raised four children and seven orphans

Worked seven days a week, from 2AM to 9PM

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A method of investigation comes next to the study of languages, a means whereby we can test the true and the false by simple and well-arranged rules. This is called **logic**. Definitions are first explained, which are peculiar to it. Thence we pass to simple and compound judgments, and lastly to the rules for proof.

This is called the science of logical proof. For this purpose there are certain recent little books such as by

[Lorenzo Valla](#) and [Philip Melanchthon](#).

Then there are Aristotle's books on **logic**, which contain much that is obscure and, in my opinion, unnecessary. The teacher should choose what is suited to the age of his pupils and to the knowledge which he imparting....

Judgment such as is inherent in wisdom, cannot be taught.

It can be driven out or it can be cultivated.

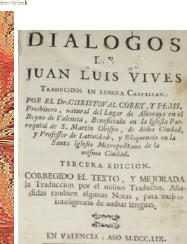
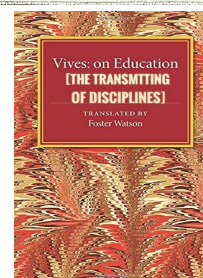
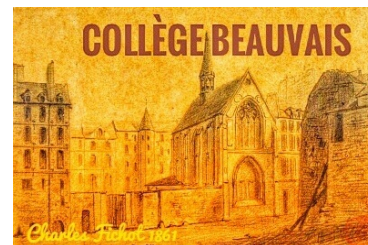
Steps can be taken for its cultivation by the reading of distinguished authors such as Plato, Demosthenes, Cicero, Seneca, Plutarch, Origen, and Jerome.

Logic too is helpful being the study of the instrument of inquiry into truth or what is like the truth (the probable).

From such studies come the greatest light into the mind.....

The practice of **logic** should not arouse a desire for competition, for that is the spirit of the **logic** itself, and if strife is added to strife, what else would that be but throwing oil on a fire, as they say?*

How far can we be expected to tolerate the babblement which has corrupted every branch of knowledge in the name of **logic**?**



Juan Luis Vives

Spanish, born Valencia, 1493

* *The Transmitting of Disciplines*

** *Against False Dialecticians*

On the Causes of the Corruption of the Arts; Dialogues; On Assistance to the Poor

The Education of a Christian Woman (dedicated to Catherine of Aragon the Queen of England)

Left Spain forever at age 16, his Marrano parents burned by the Spanish Inquisition

Early, suffocated at the College of Beauvais by scholastics who were dolts, dullards, and lax

Later, an unending severe critic of the consequences of scholasticism throughout the arts and society

Long a collaborator with [Erasmus](#) at the University of Leuven

Presaged public welfare, women's education, emotivism, psychology, educational reform,.... more

Worked at Corpus Christi College, Oxford with Thomas More and other Humanists

Favored by Catherine of Aragon, but forced abroad for supporting the excommunication of Henry VIII

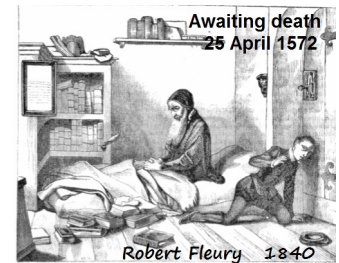
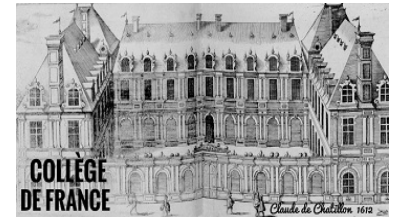
Tutor to future Queen of England, Mary I.

Most productive years during retirement in Bruges

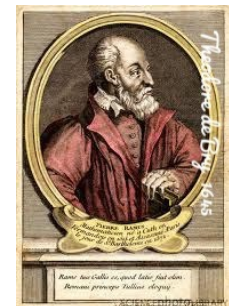
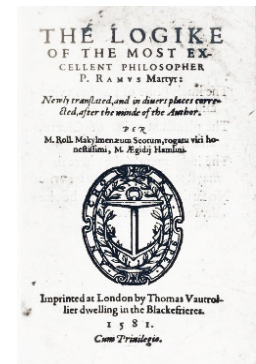
Dismissed the [Liar paradox](#) as logically ridiculous and not worth discussing

<http://www.ibe.unesco.org/sites/default/files/vivese.pdf>

Logic seeks to establish the all-around strength
of the human reason
in discovering and dealing with matters.*



Logic is the art that teaches us to dispute well.
The first part teaches to create an argument.
The second part teaches us to order
and arrange the argument to the end
that we may judge it rightly
whether the question raised in the argument
is necessarily inferred in the conclusion.**



Petrus Ramus

French, born Cuts, Picardy, 1515

**Comments on Aristotle*

***Logic*

Arguments on Rhetoric, Lectures on the Liberal Arts,
Professor of Eloquence at l'Collège de France (above)

Dozens of books and pamphlets

A flaming critic of Aristotle and both the content and style of medieval learning

Insisted that the logical method of moving from general to specific is identical in every context

Stressed that logic cannot substitute for creativity in the progress of mankind

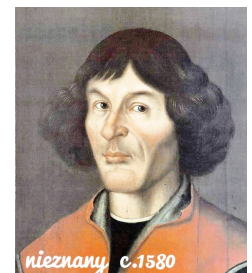
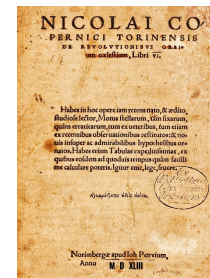
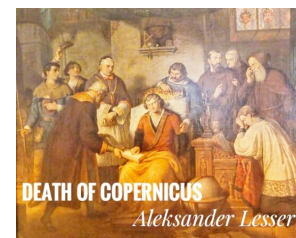
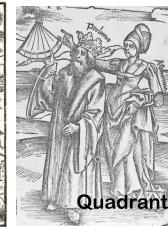
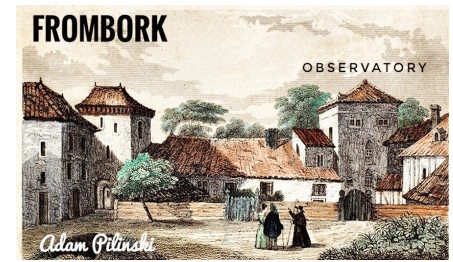
Lectures often drew many hundreds of listeners

His writings and lectures often censored

Being a Huguenot (Protestant) convert, his home burned, life imperiled, and forced into a life of travel

Returned to Paris only to be murdered in the St. Bartholomew's Day Massacre, 25 April 1572 (above)

Aristotle's division of simple motion
into three types:
away from the middle,
toward the middle,
and around the middle,
will be construed as merely
an exercise in **logic**.*



Nicolaus Copernicus

Polish, born Toruń, Royal Prussia, 1473

**On the Revolutions of the Celestial Spheres*
Commentariolus

Mathematician, physician, cleric, translator, jurist, diplomat, artist, governor, militarist

Administrator of Canonry in Frombork, Warmia

Astronomer and one of the half dozen most important scientists in history

Next after Galileo, widely regarded as a founder of the scientific method

First to fully formulate the heliocentric model

Never claimed heliocentrism a fact, only a theory

As “just a theory”, was viewed favorably by Pope Clement VII

Fearing scorn, delayed publication until just before his death

Large personal library looted by Sweden and still in Uppsala University

Rejected astrology as ignorant superstition

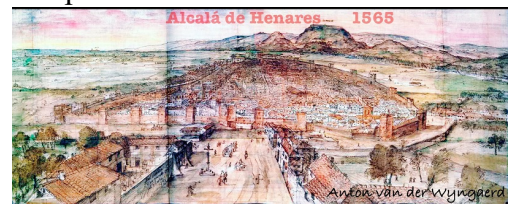
Died 65 years before telescope, used only Ptolmaic (!) triquetrum and quadrant (see above)

Lunar and Martian craters named for him

Logic is only a certain art
directing the operations of the intellect,
as they are cultivated artificially and with reason.
Hence, **logic** deals directly with mental concepts
insofar as they can be directed through art
or with the form and ordering of concepts.*



preserved hall



Francisco Suárez S.J.

Spanish, born Granada, Andalusia, 1548

**Metaphysical Disputations* (most widely read philosophy work of the time)

On Angels, On The Soul, On Charity, On Law, On Faith, On the True Mysteries of Christ

On Transubstantiation, On Double Effect

Works fill 26 volumes

Jesuit priest titled "Doctor Eximius et Pius" (Exceptional and Pious) by the Vatican

His first lecture in Rome attended by Pope Gregory XIII

Lectured at schools in Seville and Alcalá de Henares (above)

Private tutor for Pope Paul V

Chosen to refute Protestant errors of the King James Bible, his works then burned in London

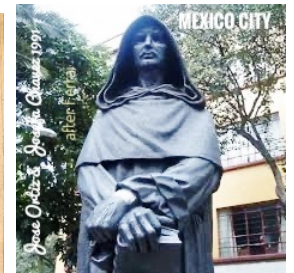
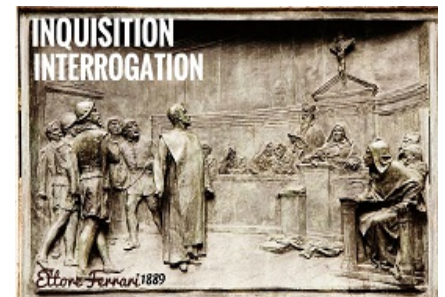
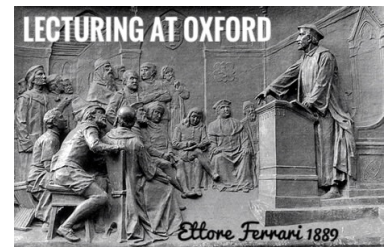
Raised strong objections to slavery and also the divine right of kings

Writings entangled in the political/Vatican-Curia/anti-Jesuit turmoil of the next 150 years

After death, some of his works indexed by Rome, banned in Paris

It is necessary that the human soul
have the light, the ingenuity,
and instruments adopted
to possess its own prey.

Toward such an end
contemplation gives assistance,
and toward this end **logic** is used,
the organ most adept
for the acquisition of truth,
for distinguishing, exploring,
and making judgments.*



Giordano Bruno

Italian, born Nola, Kingdom of Naples, 1548

**The Heroic Frenzies* [*Heroici Furori* , I, ii]; dedicated to his friend the English poet Sir Philip Sidney

The Nolan, The Shadow of Ideas, On the Infinite Universe and Worlds, Art of Memory

Ordained priest at age 24, renounced his vows at 28

Became known for his skill in the art of memory

Insisted that the dogmas of the church cannot be proved by human reason, contrary to [Ramon Llull](#)

Held that only the ignorant can take the Bible literally

Argued that Christianity is entirely irrational and that revelation has no scientific basis

Abhorred the Method Of Authority, in any context

Developed a cosmology grounded on the concept of infinity

Theorized that life forms exist on a plurality of worlds elsewhere in this infinite universe

Spent 20 years in exile

In a Papal prison for 10 years for heresy, atheism, blasphemy, sorcery, etc.

Tortured by the Inquisitor, then burned at the stake

Last words: **“You my judges, pronounce this sentence on me with greater fear than I receive it.”**

Year 2000 (!), Papacy defended Bruno's execution: **“The Inquisitor promoted the common good.”**

Lunar crater named for him

Chrysippus said that
what Plato and Aristotle wrote about **logic**
must have been written
for sport or as an exercise,
for he could not believe that
they had anything serious to say
on so empty a subject.*



Michel de Montaigne

French, born Saint-Michel-de-Montaigne, Aquitaine, 1533

**Essays*, Book Two, Chapter 12

Statesman, advisor, and famed essayist

Early a bon vivant courtier

Later, a secluded retirement in his Tower to finish the *Essays*

Remarkable and timeless insights and advice on the human condition

For example: “The best marriage is a blind woman and a deaf man.”

“Knowledge is Power.”

<https://archive.org/details/the-complete-essays-montaigne-michel-de-1533-1592/mode/2up>

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The end of **logic** is to teach a form of argument to secure reason, and not to entrap it.

The end of morality is to procure the affections to obey reason, and not to invade it;

and end of rhetoric is to fill the imagination to second reason, and not to oppress it.

For these abuses of arts come in but obliquely.....

We conclude, that rhetoric can no more be accused of coloring the worst part of imagination, than **logic** of teaching sophistry.

For we know that the doctrines of contraries are the same, though their use be opposite;

and **logic** does not only differ from rhetoric,

according to the vulgar notion,

as the first is like the hand clenched,

and the other like the hand open;

but much more in this, that **logic** considers reason

in its natural state, and rhetoric as it stands in vulgar opinion;

whence Aristotle prudently places rhetoric

between **logic** and ethics, along with politics,

as partaking of them both.

For the proofs and demonstrations of **logic**

are common to all mankind,

but the proof and persuasion of rhetoric

must be varied according to the audience

like a musician suiting himself to different ears.*

Therefore, with **logic**, judgment, and invention,

a person may do great things.**

Regarding logic vs/ rhetoric see [Seville](#), [Lull](#), and [Hobbes](#).

English, born London, 1561

Of The Advancement of Learning*, *Essays* ("Of Riches"), *The New Science*

New Atlantis remarkably accurate predictions (see illustration and legend above)

Viscount St. Albans, Lord of Verulam. jurist, scientist, Member of Parliament, Lord Chancellor

A highly significant figure in the development of modern western civilization

An early formulation of the scientific method

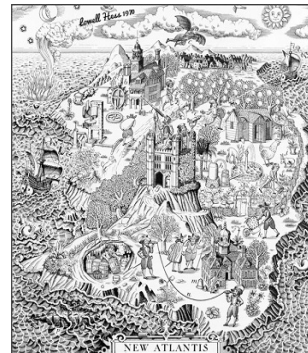
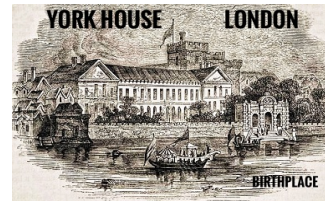
Questionably imprisoned, censured, and disgraced for corruption (see illustration above)

Retired to private life to continue study and long-lasting publications

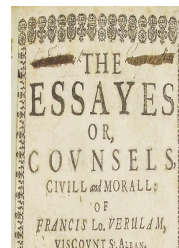
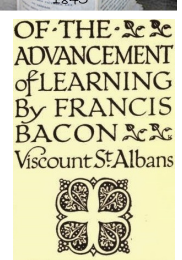
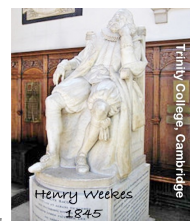
Believed by some to be the true author of Shakespeare's plays

Instrumental in colonizing North America, especially Virginia and Newfoundland

Died from pneumonia after trying to freeze a chicken



- a. Wildfires burning in water
- b. Engine houses to study motion
- c. Ability to fly in air
- d. Instruments for seeing distant objects in the heavens
- e. Light intensified and thrown great distances
- f. Glasses to see small bodies perfectly
- g. Perspective houses to study light and color
- h. Tools to strain fresh water out of salt
- i. Gardens bearing more speedily than their nature
- j. Animals bred both greater and smaller than their kind
- k. Fruit much larger than its nature
- l. Aids to improve hearing
- m. Sound houses for studying sound
- n. Sound conveyed in tubes over distances
- o. Deep caves for refrigeration
- p. Ships sailing under water.

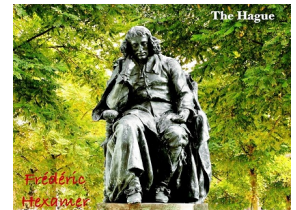
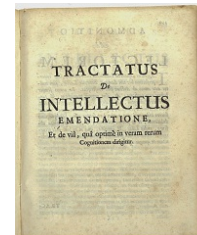
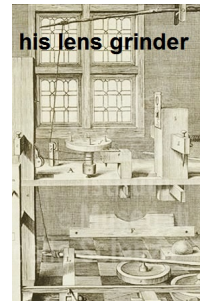
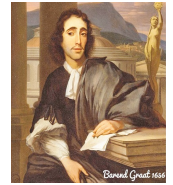


Francis Bacon

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The intellect, by its native ability makes for itself intellectual instruments [principles of **logic**], whereby it acquires strength for performing other intellectual operations, and from these operations again fresh instruments, or the power of pushing its investigations further. ...That this is the path pursued by the understanding may be readily seen when we understand the nature of the method for finding out the truth and of the natural abilities so necessary for the construction of complex instruments and for the progress of investigation.*

People prefer to be taught by experience rather than deduce their conclusion from a few axioms and set them out in **logical** order.**



Baruch Spinoza

Dutch, born Amsterdam, 1632

**On the Improvement of the Understanding*

***Theological-Political Treatise*

Ethics

Of Portuguese-Jewish descent

Then turned to developing independent and novel metaphysics

Judged a heretic, was banished from Judaism at age 24

Argued that mind, body, and all that exists are aspects of one underlying “substance”

Insisted that creator and creation are inseparable

Held that human actions are guided by self-preservation– not by free will

Employed as a lens grinder, and also supported by friends

Well respected and often sought out by leading scholars

Offered Heidelberg professorship, but declined

Never Christian, yet revered by local Protestants and buried in a sacred plot

<http://www.friesian.com/spinoza.htm>

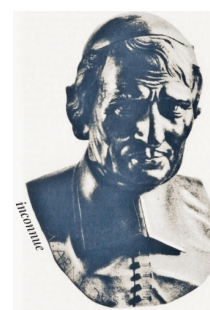
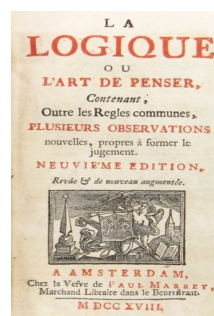
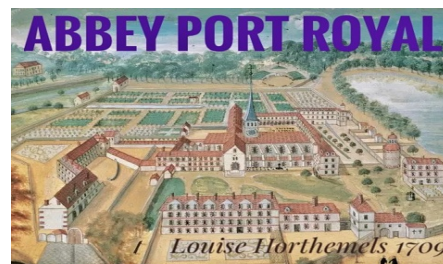
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TOC

By reflecting on thoughts,
we can notice which methods
are used when reasoning well
and which cause mistakes.

We can then form rules
based on these reflection
to avoid being caught off guard
in the future.

This properly speaking is called **logic**:
a light capable of dissipating
all the darkness of the mind.*



Antoine Arnauld

French, born Paris, 1612

**Port-Royal Logic, The Art of Thinking* with Pierre Nicole ----->

General and Rational Grammar, On True and False Ideas

New Elements of Geometry, Reflections

The pre-eminent model for all logic texts for more than three centuries

But accepted the new “scientific” materialism opposing Aristotle and Aquinas

Entire life embroiled in the religious and social turmoil of the times

Removed from the Sorbonne because of his theology, hounded thereafter

Often found refuge with his sister Angélique, Abbess of Port-Royal-de-Champs

Both he and Angélique prominent advocates of ill-fated Jansenism

First condemned, then restored, re-condemned, and re-restored by successive Popes

Works total 40 large volumes

The youngest of twenty children

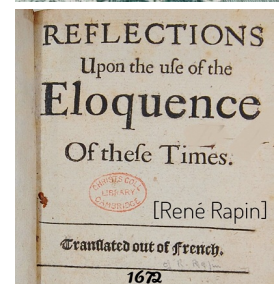
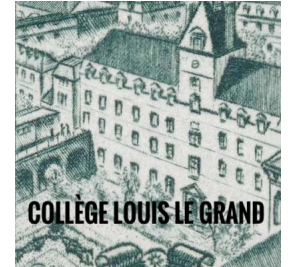
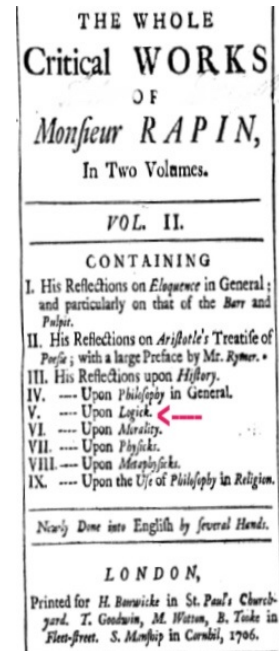


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He that is happy in a sound Sense and right Judgment
can bear no other manners,
nor any other Principles of Reasoning,
but those of Aristotle.

And because the World being governed by Opinion,
commonly disputes against Reason
the most knowing and intelligent Ages,
have chiefly distinguished themselves from others
by the Veneration they have had for this **Logick**.

For to say the Truth, what he has performed
in order to the fixing and rectifying of Reason,
by cutting off all Equivocation in Terms
and Confusion in Thought,
is one of the greatest Masterpieces of humane Wit,
yet it must be Confessed
that the chief Aim and Scope of this **Logick**
is not so much to teach Men the Art of true Reasoning,
which they naturally know,
as to give them Rules for the Trial and Scrutiny
of false Reasoning.*



René Rapin S.J.

French, born Tours, 1621

**Reflections on Eloquence, Philosophy, Logic, Pulpit, Law, Morality, Physics, Metaphysics,....*

Book of Gardens (an extensive Latin poem that established Rapin as a foremost Latin versifier of the era)

The Spirit of Christianity; The Poetics of Aristotle as to Ancient and Modern Poets; Sacred Eclogues

History of Jansenism; Observations on The Poetry of Horace and Virgil

Professor of Rhetoric at Jesuits' Collège de Clermont (becoming Collège Louis le Grand)

Wrote extensively in both verse and prose

Advocated tolerance in all matters of religion especially toward the rival Jansenists

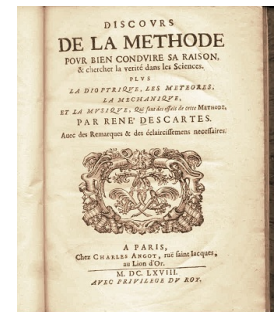
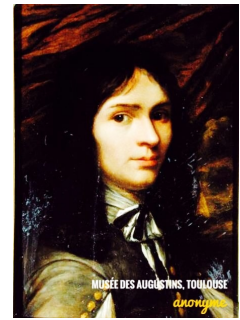
A recognized source for the grandiose gardening schemes of the next 150 years

<https://catalog.hathitrust.org/Record/100025841>

<https://books.google.com/books?id=NHFBAAAAYAAJ&printsec=frontcover&dq=ren%C3%A9+rapin&hl=en&sa=X&ved=0ahUKEwikx6-wr5nNAhVRIFIKHQrBC90Q6AEIQjAH#v=onepage&q=ren%C3%A9%20rapin&f=false>

TOC

Having previously given some attention to **logic**,
I found that its syllogisms and the majority
of its other precepts are of avail rather
in the communication of what we already know,
or even as the art of Lully,
in speaking without judgment
of things of which we are ignorant,
than in the investigation of the unknown;
and although this science contains indeed
a number of correct and very excellent precepts, there
are, nevertheless, so many others,
and these either injurious or superfluous,
mingled with the former,
that it is almost quite as difficult
to effect a severance of the true from the false
as it is to extract a Diana or a Minerva
from a rough block of marble.*



An unfortunate overreaction to medieval scholasticism

René Descartes
(with Sweden's Queen Christina)

French, born La Haye, Touraine, 1596

**Discourse on Method*

The Principles of Philosophy, Meditations, Rules for the Direction of the Mind

Seminal philosopher in the transition from the Renaissance to the Age of Enlightenment

Insistently reasoned that mind and body are entirely separate substances

Held that the universe is a mathematically designed machine

Argued that the non-existence of God is logically impossible

Introduced analytic geometry and algebraic methods anticipating the calculus

Fearing Vatican reprisal, delayed (even forbade) some publications

Lunar crater named for him

Outside in Sweden's winter before 5:00 A. M. to tutor Queen Christina and died of pneumonia

<https://www.biography.com/scholar/rene-descartes>

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The subject of **logic** covers all those things of which mind-independent being is predicated.

Formal **logic** by itself proceeds from and to that which must be considered intentions of the mind, which are apart from the nature of things.

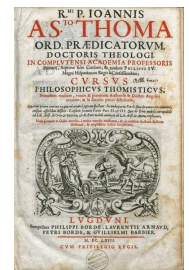
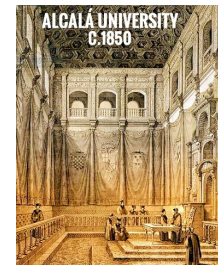
And this is why it can be said

that a logical proof is provisional or tentative....

Even so, a formal proof should succinctly and distinctly be proposed as syllogism that contains three propositions, which are called the major premise, the minor premise, and the conclusion connected by the sign of deduction, which is the particle 'therefore'.

Care must be taken that the deduction be valid.

For example: "Whatever opposes true human virtue ought not to be embraced;
a voluptuous life opposes true human virtue;
therefore it ought not to be embraced."



John Poinset

Portuguese, born Lisbon, 1589

When ordained a Dominican, took the name John of St. Thomas

**The Art of Logic; Philosophy Courses; Theology Courses*

Student at Louvain, professor at Plasencia; philosophy/theology chair at Alcalá

Major figure in late scholasticism and laid the foundations of semiotics

Masterfully coalesced ancient, medieval, and Renaissance philosophy

Though an Inquisition interrogator, often successfully defended the accused

At age 54 called away from academe to be royal confessor/advisor

Accompanied Spain's Philip IV on military campaigns

At King's request wrote *Treatise on a Happy Death*

Unhappily, death at age 55; reportedly poisoned by jealous aristocracy

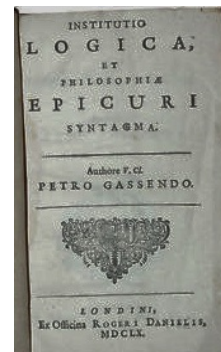
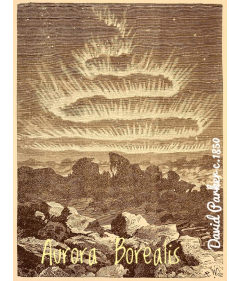
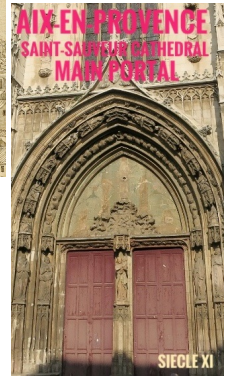
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<https://www.nytimes.com/1986/03/30/books/a-signifying-man.html>

Logic is the art of correct thinking.
Its principles can be divided into four parts:
simple apprehension, the proposition,
the syllogism, and order.*

Nothing can be proved by syllogism
except by Begging the Question [*Petitio Principii*],
that is, by concluding the same from the same.**§

In a syllogism that has premises
that are contingent or probable,
the conclusion that it proves
acquires a measure of doubt
and is thereby an opinion.*



Pierre Gassendi

French, born Champtercier, Provence, 1592

* *Instructions in Logic*

** *Paradoxical Exercises Against the Aristoteleans; The Philosophy of Epicurus*

Catholic priest, philosopher, theologian, astronomer, physicist, logician, cartographer

Doctorate at the University of Avignon and professor at universities in Aix and Paris

Strove against the prevailing unquestioned acceptance of Aristotle as the authority on science and philosophy.

Much in favor of the empiricism of Epicurus and Lucretius

A healthy skepticism while seeking knowledge through observation instead of dogma

Demonstrated a new theory of motion by dropping objects on a moving ship

First to chart the transit of the planet Mercury across the sun and first to observe the Orion Nebula

Challenged the philosophy of René Descartes, even in public debate

A firm supporter of Copernicus and Galileo, produced experiment in support of the theory of Atomism

Denominated the northern lights “Aurora Borealis” (above); awarded a lunar crater

Deserving of more notice in the History of Ideas

§ A remarkable anticipation of [John Stuart Mill](http://www.bu.edu/wcp/Papers/Logi/LogiFish.htm), 200 years later

<http://www.bu.edu/wcp/Papers/Logi/LogiFish.htm> very highly recommended

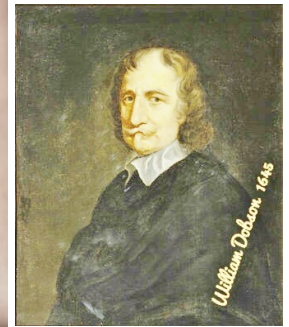
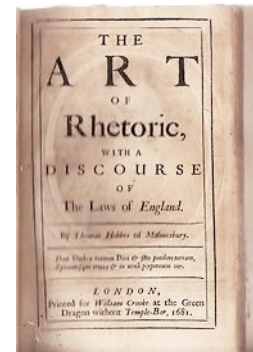
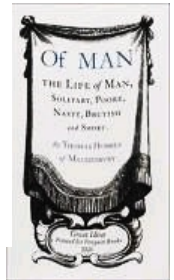
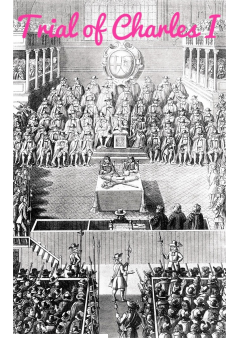
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Proofs are, in rhetoric,
either examples or enthymemes;
as in **logic**, inductions or syllogisms.
For an example is a short induction,
and an enthymeme a short syllogism;
out of which are left, as superfluous,
that which is supposed
to be necessarily understood by the hearer;
to avoid prolixity, and not to consume
the time of public business needlessly.

....

In the hands of the theologian,
logic, or the art of reasoning,
was nothing more than an unintelligible jargon,
calculated to support sophism,
to countenance falsehood,
to attempt to prove
the most palpable contradictions. §*

Regarding logic vs/ rhetoric also see [Seville](#), [Llull](#), and [Bacon](#) .



Thomas Hobbes

English, born Westport, Wiltshire, 1588

* *The Art of Rhetoric Plainly Set Forth*

Leviathan— The Matter, Form, and Power of a State (classic in modern Political Philosophy)

The Elements of Law, Natural and Politic, Man and Citizen, Common Laws of England

B.A. Magdalen Hall, Oxford; but never a fellow of any college

A tutor in aristocratic circles; philosopher and private scholar

Collaborated with leading figures: [Bacon](#), Mersenne, [Descartes](#), Galileo,....

Masterfully portrayed life without civil authority as **“poor, nasty, brutish, and short”**

Thus for protection, emerges a social contract, civil society, and rule by a sovereign

Works largely engendered by the Civil Wars and King Charles I (above)

At root an empiricist, convinced that all ideas come through and are grounded in sensation

A heated exchange with [John Wallis](#) on Squaring The Circle—Hobbes the loser

Many years in Paris to avoid entanglement in England's treacherous upheavals

His last words **“A great leap in the dark”**

§ I. e., Given a statement that is logically derived. from premises, if even one theologian's premises is false (muddled, incomprehensible....), that statement has not been demonstrated.

I claim that under the name of **logic**
we will understand such a science
that directs apprehension, judgment, and argumentation....
I am about to introduce new **logic**, truly oblique [relational],
about which the ancient logicians said nothing, or very little....

I say I am about to introduce **logic** wholly distinct
from the old one and based on opposite foundations....

Though I have no intention to destroy ancient **logic**,
I claim that the foundation of the Aristotle's **logic** is useless
[i.e. *two things each equal to a third are equal to each other*].
[Assuming instead that *two things that are related to a third
are related to each other*],

I set out on a new way, with really distinct terms
from which I create new propositions and new syllogisms.*

But which bad things would occur in the world if, *per impossibile*,
two **logically** contradictory propositions would be true together

Or, what if, *per impossibile*, one and the same proposition
would be both true and false?

I answer: then in the whole world not a single truth would remain.**



Juan Caramuel y Lobkowitz

Spanish, born Madrid, 1606

**Rational Philosophy* (mistitled *Rational Theology* by the printer)

***New Subtleties in Language*

Two-Headed Mathematics (a complete encyclopedia of the mathematical sciences)

A remarkable polymath, long overlooked; doctorate in theology from the University of Louvain

Works on grammar, poetry, oratory, mathematics, astronomy, architecture, physics, politics, law, theology...

Efforts in the logic of relations later refined by [Hamilton](#), [De Morgan](#), and [Peirce](#)

A Cistercian, received at La Espina monastery (above)

Spoke twenty languages including Latin, Greek, Arabic, Syriac, Hebrew and Chinese

Significant work in modal logic and philosophy of law

Sought solutions to theological problems through mathematics

A military leader successfully defending Prague when attacked by Sweden in the Thirty Years War (above)

First to publish work on binary numbers

Published a collection of puzzles and proposed a new method of trisecting an angle

Developed a longitude finder using the position of the moon; argued for the creation of a universal language

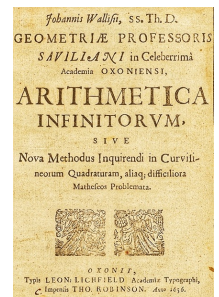
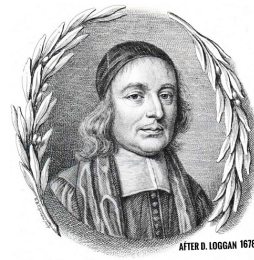
Advocating [Probabilism](#) thereby earning the derisive sobriquet "Prince of the Laxists"

While bishop there, designed and supervised the west facade of the Vigevano Cathedral (above)

<http://kfcmtf.upol.cz/uploads/Dvorak/Caramuel080702.indd-1.pdf>

<https://blogs.loc.gov/law/2011/12/caramuel>

Logic, is the art (or skill)
of reasoning (or discoursing).
It directs the mind (or understanding)
rightly to manage (or make use of)
reason in discourse.
The object of **logic**,
(or that about which it is conversant),
is all things real or imaginary--
whatever we can discourse of.
Discourse is either mental, that of the mind,
whereby we think of and compare
things one with another
and infer one thing from another.
Or vocal, whereby we express in words
those thoughts or inward discourse
of the mind.*



John Wallis

British, born Ashford, Kent, 1616

**Institutio Logicæ*

Arithmetica Infinitorum (evolved into the calculus by [Newton](#) and [Leibniz](#))

Algebra; *English Grammar*

Introduced the symbol ∞ to represent the concept of infinity and used $1/\infty$ for an infinitesimal

Presbyterian minister, BA, MA Emmanuel College, Cambridge; DD Oxford

Fellow of Queens' College, Cambridge

Highly sought after cryptologist for Parliament and the royal court during the Civil Wars

Prominent in establishing the Royal Society

A heated exchange with [Thomas Hobbes](#) on Squaring The Circle – Wallis the winner

Advances in musicology and maintaining church organs

Devised a system for teaching a deaf boy to speak

Savilian Professor of Geometry at Oxford University for 54 years

Eponym of the John Wallis Academy in Ashford, Kent—his birthplace

<https://royalsocietypublishing.org/doi/epdf/10.1098/rsnr.2018.0047>

<https://3010tangents.wordpress.com/2015/04/05/john-wallis-a-man-before-his-time/>



TOC

Sometimes we conclude by **logic** a manifest absurdity
from the negation of a hypothesis,
and then the hypothesis is true;
or instead we conclude by **logic** a manifest absurdity
from its affirmation, and then the hypothesis is established as false;
and when we have not been able to derive an absurdity,
from either its negation or its affirmation,
the hypothesis remains in doubt;
so that, to establish the truth of a hypothesis,
it is not enough that all the phenomena follow from it,
but if there follows by **logic** something contrary to
one of the phenomena, that is enough to establish its falsity.*

If your aim is to ruin my reputation, by calumniating me
before persons of honour, and I cannot prevent it
by any other means than killing you, may I do so?"

Yes—observe the proof: If when you attempt
to take away my honour by giving me a blow,

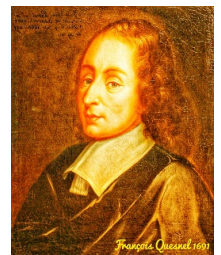
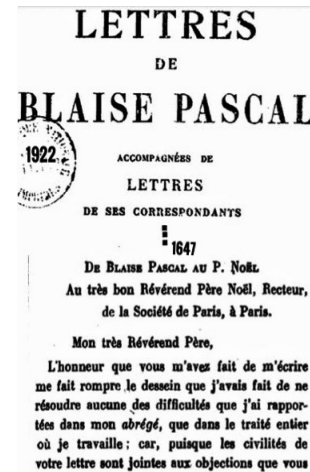
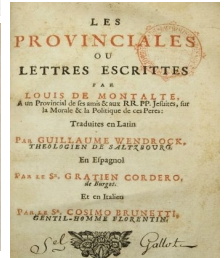
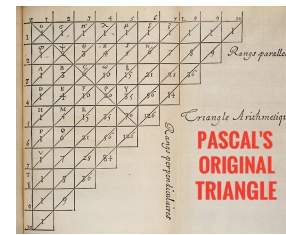
I may prevent it by force of arms,
the same kind of defense is allowable when you aim
to do me the same injury with your tongue.

Moreover, we may prevent affronts—
therefore we may prevent slander .

Lastly, honour is dearer than life;
but it is lawful to kill another in defense of life;
therefore it is equally so to kill in defense of honour.

This is sound **logical** argument.

It is not talk and rant, but demonstration!**



Blaise Pascal

French, born Clermont-Ferrand, 1623

*Reply to the Very Reverend Father Noël

***Provincial Letters VI* (a satire under pseudonym; not Pascal's own assertions)

Pensées

Significant contributor to the *Port-Royal Logic* ([Antoine Arnauld](#))

A remarkable genius in science (including barometry [above]), religion, mathematics, and literary style

Produced new mathematical proofs before age thirteen

Put forward "Pascal's Wager": a logical argument for religious Faith

"If you believe even though God does not exist, you lose nothing.

But if you don't believe and God does exist, you lose everything. Thus you ought to believe in God."

Eponym for the array of binomial coefficients (above)

Studied with the leading scholars of the era, but never held a professorship

By royal decree, given a monopoly for his calculating machine – the **Pascaline** (above)

Devised new mechanisms for hydraulic engineering; a founder of the theory of probability

Lunar crater named for him

http://www.thocp.net/biographies/pascal_blaise.html

FIND POSTAGE STAMP

TOC

What room is there for the exercise of any other faculty,
but outward sense and inward perception?

What need it there of reason [logic]?

Very much: for it is necessary and assisting
to all our other intellectual faculties.

It so orders the intermediate ideas as to discover
what connexion there is in each link of the chain,
whereby the extremes are held together;

and thereby, as it were, to draw into view the truth sought for,
which is that which we call illation or inference,

and consists in nothing but the perception

of the connexion there is between the ideas,

in each step of the deduction; whereby the mind comes to see,
either the certain agreement or disagreement of any two ideas,

as in demonstration, in which it arrives

at knowledge; or their probable connexion,

on which it gives or withholds its assent, as in opinion.

Sense and intuition reach but a very little way.

The greatest part of our knowledge

depends upon deductions and intermediate ideas:

and in those cases where we are

fain to substitute assent instead of knowledge,

and take propositions for true, without being certain they are so,

we have need to find out, examine,

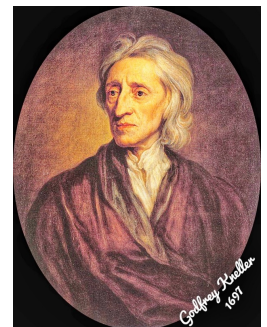
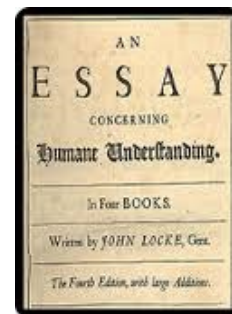
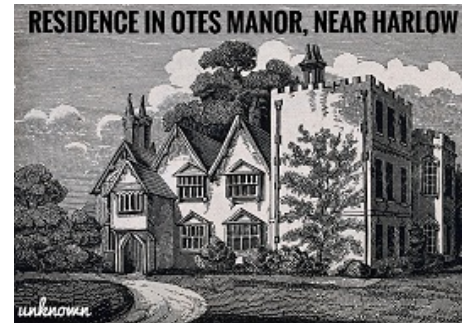
and compare the grounds of their probability.

In both these cases, the faculty which finds out the means,

and rightly applies them,

to discover certainty in the one, and probability in the other,

is that which we call reason [logic].*



John Locke

English, born Wrington, Somerset, 1632

**An Essay Concerning Humane Understanding* (compressed from Book IV, chapter xvii)

Questions Concerning the Law of Nature (cf. folios 49-51)

Two Treatises of Government (fundamental sources for revolutions in America and France)

Philosopher, physician, and defender of free government

Likened the mind to a “tabula rasa” on which all experience is written

Argued and insisted that Life and Liberty are inherent human rights

Formulated the basis of the Spirit of Democracy

Stressed the importance of toleration.

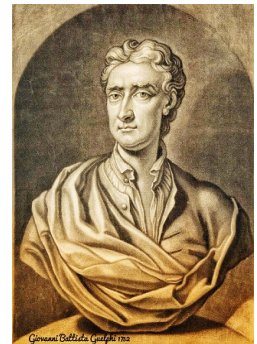
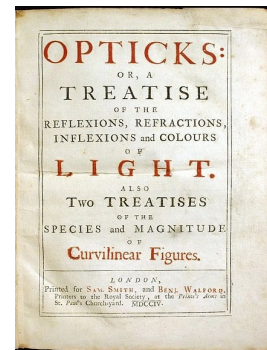
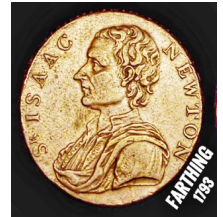
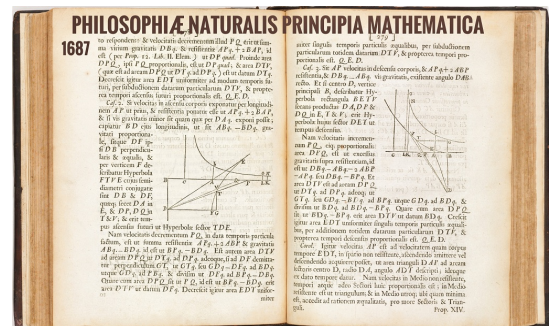
At risk for advocating democracy and toleration chose self exile in Holland; on return a hero

Supervised life-saving liver surgery (long before anesthesia)

http://www.johnlocke.org/about/who_is_john_locke.html

FIND STAINED GLASS

Those who think to find
the true principles of physics
by **logic** alone,
fail to understand
that sound science
is founded on observation.*



Isaac Newton

English, born Woolsthorpe-by-Colsterworth, Lincolnshire, 1643

**Optics*

Principia Mathematica (Latin [above], translated after his death)

By most accounts the greatest scientific genius ever

Established gravitation and the laws of motion

Derived therefrom all planetary phenomena

Developed nearly the complete science of optics

Invented the calculus (coincidental with [Gottfried Leibniz](#))

Discovered a new formula to calculate π

Oddly, wrote more works on alchemy than anything else

A bachelor and highly reclusive

Was certain that nature's intricacies prove God's existence

As head of the Royal Mint, gained convictions and gruesome executions for counterfeiters

Elected to Parliament, his only recorded words were about how drafty the chamber was

Died of mercury poison (from alchemy experiments), penniless

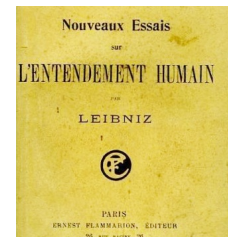
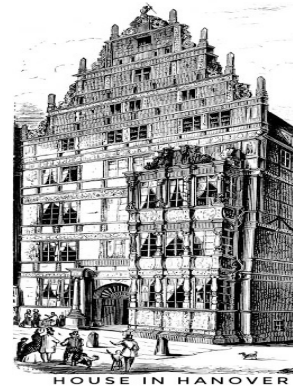
Lunar and Martian craters named for him

This art of **logic** concerns
all kinds of reasoning
in which inferences
are executed by their form.*

The basis of the syllogism is this:
if some whole, C, falls within some D
or if a whole, C, falls outside some D,
then in the first case
that which is in C will fall within D,
and in the second case it will fall outside D.
This is what is commonly called
the *dictum de omni et nullo*.**§



Work room in Hanover



Gottfried Leibniz

German, born Leipzig, Saxony, 1646

**New Essays on the Human Understanding*

***Unpublished Pamphlets and Fragments*, *Explanation of Binary Arithmetic*, *Monadology*

Philosopher, mathematician, jurist, engineer, theologian, physicist, linguist, logician, diplomat, historian

Denied doctorate degree by University of Leipzig because of his youth

Never held a university position

Espoused the Principle of Sufficient Reason—that nothing occurs without a logical explanation

Argued that a divine plan made this the best of all possible worlds

Derived syllogistic and proposition logic from algebraic calculi

Invented calculus (coincidental with [Isaac Newton](#))

Formulated the binary number system, later elaborated and refined by [George Boole](#)

Designed one of the earliest calculators—the Step Rechner (above)

Loved gambling, but later argued that knowledge cannot be based on probability

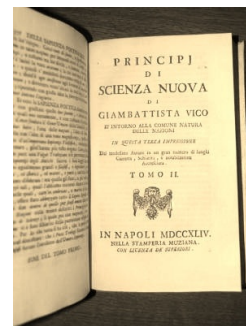
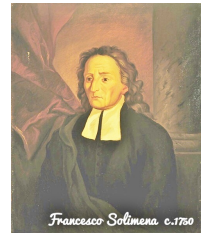
Set forth the basis of library science; lunar crater named for him

§ Underlying canon in Aristotelian logic

<http://www.philosophypages.com/ph/leib.htm>

FIND POSTAGE STAMP

The human mind needs **logic**
in order to form
clear and distinct ideas,
but concrete examples
precede the use of **logic**.*



Giambattista Vico

Italian, born Naples, 1688

**The New Science*

The Academies and the Relation between Philosophy and Eloquence

On Humanistic Education, Autobiography

A truly revolutionary mind, far ahead of his time

Professor of Rhetoric, University of Naples

Stressed that logic can achieve nothing except within a human context

Argued that we can know only what we have made or are in the process of making

Such as: Language, Myth, Industry, Tradition, Government, Art, etc. In a word – HISTORY

Thus held that God is totally unknowable, since man did not make God

His work virtually forgotten for 100 years

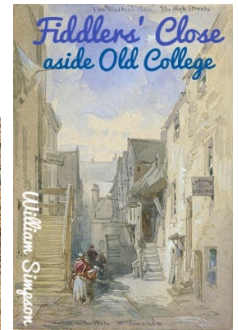
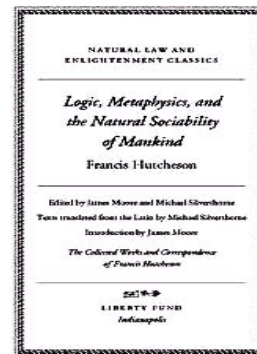
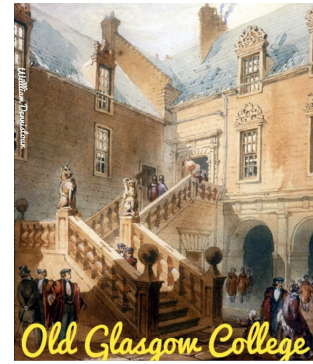
TOC

Logic is the art which directs the mind
in its acquisition of knowledge of things,
and may also be called the science or the art
of investigating and expressing truth.
The material object of any skill or science
is the material which it treats.

The formal object
is the reason or purpose of treating it.

The material object of **logic**
is the intellectual operations.

The formal object
is to be directed to the discovery of truth.*



A
SYSTEM
OF
MORAL
PHILOSOPHY.
IN THREE BOOKS;
WRITTEN BY THE LATE
FRANCIS HUTCHESON, L.L.D.



Francis Hutcheson

Scottish, born Drumalig, Saint Field, County Down, 1694

**Logic, Metaphysics, and the Natural Sociability of Mankind*

Enquiry into the Original of Our Ideas of Beauty and Virtue

Essay on the Nature and Conduct of the Passions and Affections

Reflections upon Laughter, A System of Moral Philosophy

The Meditations of the Emperor Marcus Aurelius (translator)

Presbyterian minister and a significant figure in the Age of Enlightenment

Proponent of liberty and freedom of ideas

Professor of Moral Philosophy at The University of Glasgow

Highly influential mentor of the great economist Adam Smith

Fervently preached that benevolent feelings form part of human nature

Argued that the test of virtuous action is that it aids the general welfare

Such ideas dismissed by the Presbytery as contrary to its two basic tenets:

(i) that the standard of moral goodness is God's word and commands

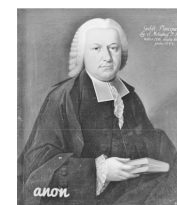
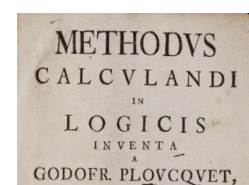
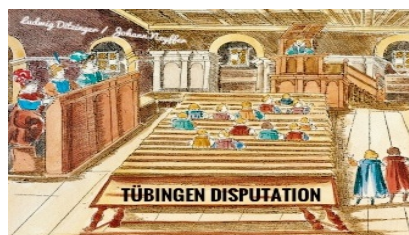
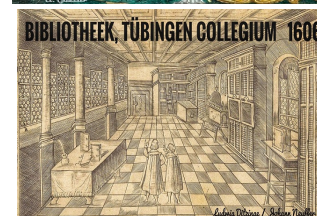
(ii) that man cannot know good from evil apart from knowledge of God

A highly regarded and influential moral philosopher in colonial America

Stood for unalienable rights and collective right to resist tyranny

http://oll.libertyfund.org/?option=com_staticxt&staticfile=show.php%3Ftitle=1723&Itemid=27

The **logic** calculus which I present here
makes use only of the signs of identity and diversity,
nevertheless it is prolific in inventing and proving
the syllogisms and their combinations very easily,
without admitting any errors,
rather it detects their origins.
It also does so without requiring
that the syllogistic figures and moods be known;
instead all valid syllogisms are invented and proven
by one and the same direct operation.*



Gottfried Ploucquet

German, born Stuttgart, 1716

* *Method of Calculation in Logic*

Investigation and Modification

Theoretical Explanations in Philosophy

Elements of the Science of Thinking

Fundamentals of Speculative Philosophy

Raised in the Pietist movement and served as a pastor

Inspired by René Descartes

Professor of logic and metaphysics at Tübingen University

Introduced quantifying the predicate in syllogistic logic

Advanced the logic of relations and adumbrated symbolic logic and set theory

Attacked the materialist doctrines of the time

Strove to reshape all philosophy (including logic) based on ontology and theology

Late in life also appointed professor at the Stuttgart Military School

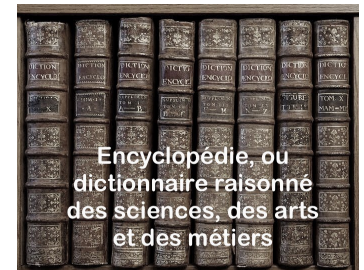
Final twenty years in total seclusion, yet still highly productive

Before death his library and manuscripts lost by fire

<https://www.biblicalcyclopedia.com/P/ploucquet-gottfried.html>

<https://www.britannica.com/biography/Gottfried-Ploucquet>

TOC



Denis Diderot

French, born Langres, Champagne, 1713

**Preliminary Discourse to The Encyclopedia*

A magnum opus in all Western thought

Editor-in-chief with many contributors

Quotation likely by prime collaborator Jean d'Alembert----->

Rameau's Nephew; On the Interpretation of Nature

The Nun (a stinging indictment of religion's vice-like grip on mankind)

A leading force in the struggle for freedom of thought

An open atheist, materialist, and hostile to religious authority

Argued that only the virtuous can know true happiness

Held that only by using reason can mankind find truth and achieve progress

Lunar crater named for him



<http://people.brandeis.edu/~teuber/diderotbio.html>

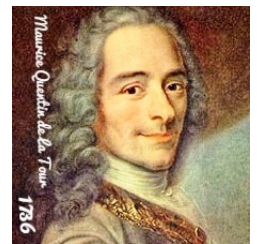
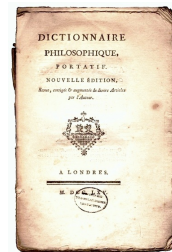
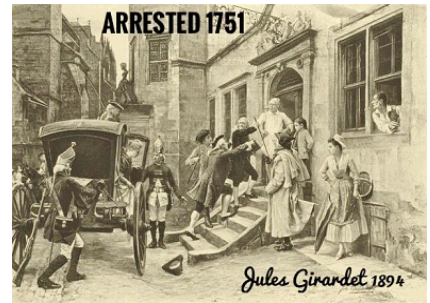
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TOC

I suppose that if one had given only six months
to teaching Pilate the truths of **logic**,
he would assuredly have made
this conclusive syllogism:

....

One must not take away the life of a man
who has only preached good morality:
Well, the man who has been impeached has,
on the showing of his enemies even,
often preached excellent morality;
therefore he should not be punished with death.*



Francois-Marie Arouet – “Voltaire”

French, born Paris, 1694

**Philosophical Dictionary*– “Truth”

Printed anonymously in London and secreted back to France

The Elements of Sir Isaac Newton's Philosophy

Zidig Chapter 3, "The Dog and the Horse", founding epitome for abductive logic, highly recommended

Candid, Mérope, Olympia, Alzire, Orestes, Oedipus, Zaire, Philosophical letters

The Age of Louis XIV, The Philosophy of History

The English Essays, A Treatise on Tolerance

Plus 20,000 letters and 2,000 pamphlets

Poet, novelist, playwright, historian, scientist and philosopher

One of the greatest figures in the advance of freedom in modern civilization

A master satirist against the “ancien régime,” intolerance, and restraint of ideas

Imprisoned for revolutionary publications and often fled Paris to escape censure

Close friendship with Benjamin Franklin

<http://www.thegreatdebate.org.uk/Voltaire.html>

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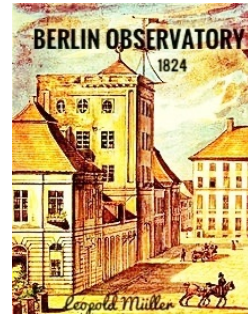
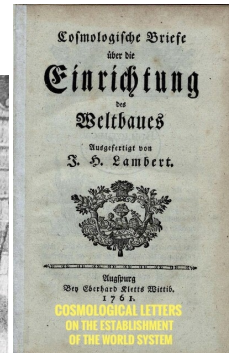
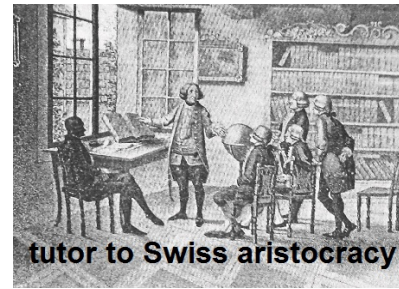
Logical truths are immutable
and can be derived a priori.

By contrast, physical truths are a posteriori,
because we must take the world as it is,
and because the Divine mind sees deeper
than it is possible for us.

Only through research can we find them a priori.*

Our knowledge of the forms of **logic**
is incontestable.

Letter to Immanuel Kant.



Johann Heinrich Lambert

Abhandlung vom
Criterium veritatis

in einem erläuternden Vorwort aus dem Manuskript
herausgegeben

von
Dr. K. Bopp

Professor an der Universität Bonn



TREATISE ON THE CRITERION OF TRUTH

Berlin
Verlag von Reuther & Reichard
1900



Johann Lambert

Swiss, born Mulhouse, 1728

**Treatise on the Criterion of Truth*

New Hypothesis of the Universe, Pyrometric, Photometric

Cosmological Letters on the Arrangement of the World Structure

The Distinction between Error and Appearance

Primary Elements in Philosophical and Mathematical Knowledge

Virtually totally self-taught

From age 20 to 48 produced important work while tutoring and serving Swiss aristocrats

Provided the first proof that π is not a rational number

Leading astronomer at the Prussian Academy of Sciences

Invented an accurate way of measuring the intensity of light

Theorized that there are other galaxies beyond our own

Struggled throughout life to find academic employment

Published 150 articles and books

Never married and had no children

Died at age 49 from tuberculosis

Lunar and Martian craters named for him

<http://spider.seds.org/spider/Misc/lambert.html>

TOC

The operations of the mind are three:
Simple Apprehension, Judgment, and Discourse.

But our Apprehensions apt to be indistinct,
our Judgment false, our Discourse inconclusive.
To prevent this, wise men prescribed several rules
which were at length collected into one body
and termed **logic** or The Art of Reasoning.

But we cannot express to another
what passes in our own mind any otherwise than by words.
It is therefore by teaching us the proper use of words
that **logic** assists the mind to apprehend distinctly,
to judge truly, and to discourse conclusively.*

...

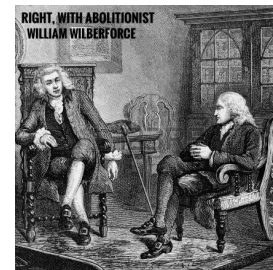
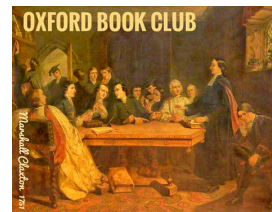
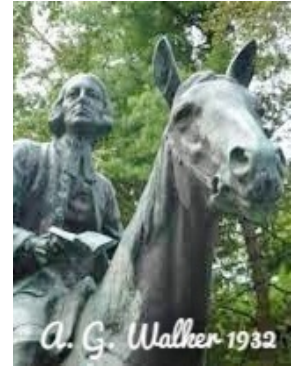
Dear brother: I had rather dispute, if I must dispute,
with you than with any man living
because it may be done
with so little expense of time and words.

The question is now brought to one point,
and the whole of the argument will be in one syllogism:
Neither hope of doing greater good nor fear of any evil
ought to deter you from what you have engaged yourself .

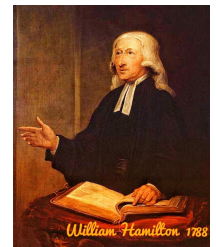
But you have engaged yourself
to undertake the cure of a parish:
So neither that hope nor that fear ought to deter you in it.**

...

It is a wonder that anyone has patience to learn **logic**,
but those who do it on a principle of conscience;
unless he learns it as three in four
of the young gentlemen in the Universities do:
That is, goes about it and about it,
without understanding one word of the matter.***



A
COMPENDIUM OF LOGIC:
TRANSLATED AND ABRIDGED FROM ALDRICH,
BY THE REV. JOHN WESLEY, M.A.,



John Wesley

British, born Epworth, Lincolnshire, 1703

**A Compendium of Logic* (his translation of Henry Aldrich's long-standing *Artis Logicae Compendium*)

**Letter to his brother Samuel in 1725

****Journal* 1746-1749

Fellow of Lincoln College, Oxford

Anglican priest, founder of Methodism; tireless and captivating preacher, orator, and evangelist

Instrumental in the growth of piety in colonial America, even preaching to native American Indians

Facing charges of ministerial misconduct in the Georgia colony, fled back to England

Held that the study of logic is next in importance to the study of the Bible!

Several sermons resemble lectures on logic.

<https://literariness.org/2019/04/22/the-philosophy-of-george-berkeley/>

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Logic prescribes rules for valid reasoning
the observance of which will secure us from error.....
We frequently employ compound propositions which contain more
than two notions and respecting which, rules are to be observed
in order to deduce fair conclusions from them.

Of this conditional proposition:

If A is B, C will be D.

The first part A is B is called the antecedent,
and the other C will be D the consequent.

Logic prescribes the two following rules
to direct us in this style of reasoning:

- (I) Whoever admits the antecedent
must likewise admit the consequent.
- (II) Whoever denies or rejects the consequent
must likewise deny or reject the antecedent.

But you may very well deny the antecedent
without denying the consequent
and likewise admit the consequent
without admitting the antecedent....

The following is an example of a conditional proposition:

“If the gazette speaks truth, peace is not very distant.”

There are two ways of drawing a conclusion from it.

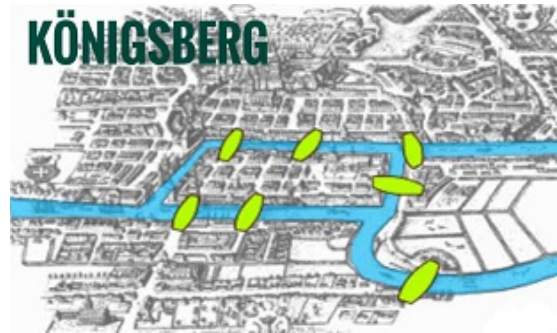
1st When some person assures us that the gazette speaks truth,
for hence we conclude that peace is near.

2nd When we are told that peace is still very distant,
then we make no hesitation in thence concluding
that the gazette does not speak truth.

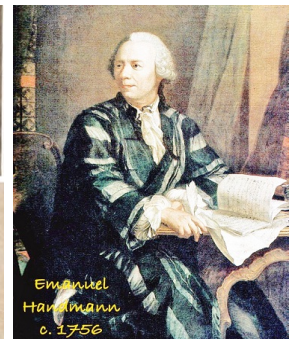
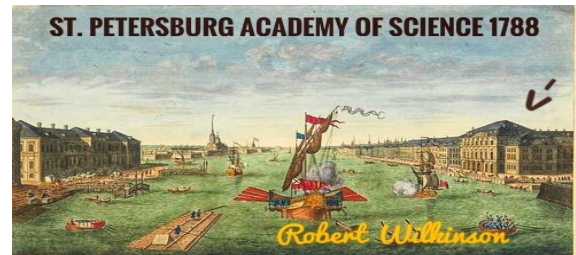
....

Logic is the foundation of the certainty
of all the knowledge we acquire....

But it is entirely unnecessary
to detain you any longer on this subject.*



go to [BRIDGES](#)



Leonhard Euler

Swiss, born Basel, 1707

**Letters to a German Princess* (the international standard in home learning for 150 years)

Foundations of Differential Calculus, Introduction to Analysis of the Infinite

Distinguished Professor in Basel, St. Petersburg, and Berlin

“Euler Circles” — the first general diagram method for testing validity in logic

Founded graph theory and presaged topology via The Bridges of Königsberg (see above with link)

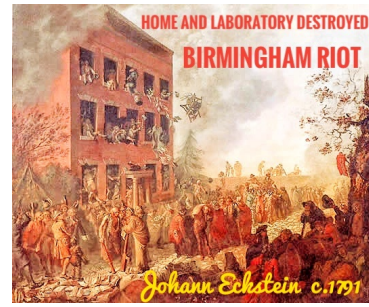
Established several standard symbols in mathematics, e.g. Σ , e , π

Wrote 900 works, half of them while totally blind in the last 20 years of his life

Important advances in astronomy, mechanics, optics, acoustics, theoretical aerodynamics

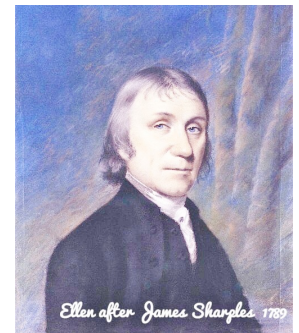
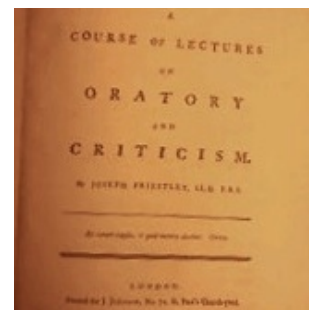
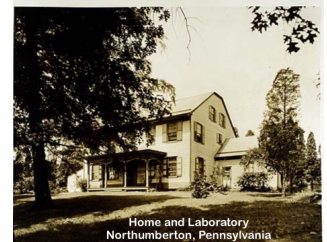
Recited Virgil’s Aeneid verbatim without hesitation.; lunar crater and mountain in his name

It is necessary, likewise,
as far as reasoning is concerned,
that a person be, in some sense, a logician
before he be an orator;
since it is by the rules of **logic** that we judge
of every thing relating to arguments,
their perspicuity or confusion,
their fallacy or their force.
But notwithstanding this be treated of
in many books written on the subject of oratory,
and particularly by Aristotle,
those plain principles of **logic**
are obvious to common reflection,
and must have occurred to every person
before he hath lived to the age
in which he has any occasion for the art of oratory.*



oxygen apparatus

LIBERAL EDUCATION
FOR
CIVIL AND ACTIVE LIFE.
WITH PLANS OF LECTURES ON
I. The Study of History and general Policy.
II. The History of England.
III. The Constitution and Laws of England.
TO WHICH ARE ADDED,
REMARKS
ON A
CODE OF EDUCATION,
Proposed by Dr. BROWN, in a late Treatise, intitled,
THOUGHTS ON CIVIL LIBERTY, &c.
By JOSEPH PRIESTLEY, LL.D.



Ellen after James Sharpley 1789

Joseph Priestley

British, born Birstall, Yorkshire, 1733

**A Course of Lectures on Oratory and Criticism*

Essay on a Course of Liberal Education for Civil and Active Life

The History and Present State of Electricity, Essay on the First Principles of Government

Originator of the motto of Utilitarianism **“The greatest happiness of the greatest number”**

Institutes of Natural and Revealed Religion, The Doctrine of Philosophical Necessity Illustrated

Disquisitions relating to Matter and Spirit; A History of the Corruptions of Christianity

A truly remarkable figure in the progress of mankind in the modern world

Theologian, Dissenting clergyman, scientist, educator, political theorist, and social reformer

Seminal experiments and observations on oxygen, photosynthesis, optics, carbon monoxide, rubber,... more

Insisted on freedom of speech, ideas, and religion; supported the French revolution and American independence

Prime target of the Birmingham anti-Dissenters riot, home and laboratory burned; hounded in other cities

Emigrated to the United States after independence, home in Pennsylvania, never returning to England

Preached/ lectured widely in America; warmly received by John Adams and Benjamin Franklin

From letter to him by President Thomas Jefferson: **“Yours is one of the few lives precious to mankind.”**

A profound influence on the *Jefferson Bible*

Founded Unitarian Church in England and its leading proponent in America

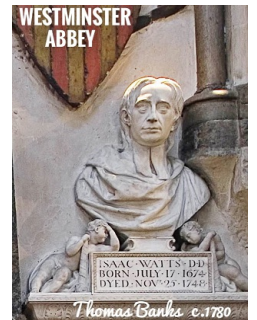
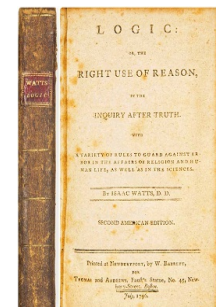
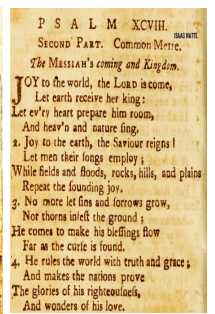
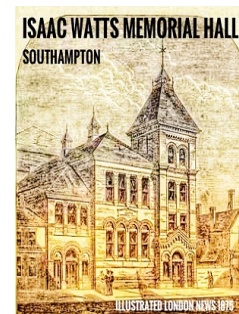
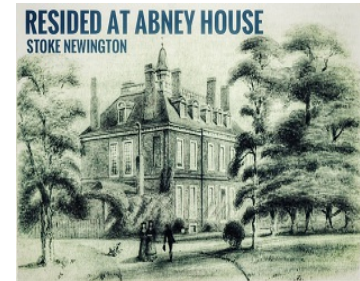
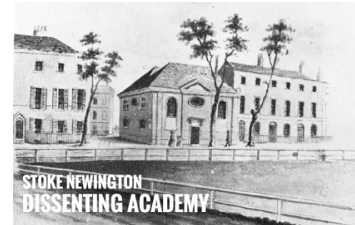
Held that learning the truths of science will lead to a “Golden Age” of peace, harmony, stability, and prosperity

Fluent in seven languages; authored over 500 books and pamphlets

Perhaps his most enduring and treasured legacy— soda pop

Lunar and Martian craters named for him

It was a saying among the ancients,
Veritas in puteo. “Truth lies in a well;”
 and to carry on this metaphor, we may very justly say
 that **logic** does, as it were, supply us with steps
 whereby we may go down to reach the water;
 or it frames the links of a chain,
 whereby we may draw the water up from the bottom....
 There are a thousand things which are not in reality what they
 appear to be,...and **logic** helps us to
 strip off the outward disguise of things, and to behold them,
 and judge of them in their own nature....
 So that one great part of the design of **logic**
 is to guard us against the delusive influences
 of our meaner powers, to cure the mistakes of immature judgment,
 and to raise us in some measure from the ruins of our fall....
 [Yet] I confess, much ingenuity has discovered
 the precise number of syllogisms
 that may be formed in every figure, and giving the reasons of them;
 yet the light of nature, a good judgment,
 and due consideration of things, end more to true reasoning
 than all the trappings of moods and figures.**



Isaac Watts

British, born Southampton, 1674

**Logic: The Right Use of Reason in the Enquiry after Truth* (text at Oxford, Cambridge, Yale, Harvard)

“far superior to the treatises now used in colleges,

being the production of a man distinguished for good sense” [Charles Sanders Peirce](#)

The Art of Reading and Writing English; Sermons and Religious Tracts (in ten volumes),

Only formal education at the Stoke Newington Dissenting Academy (above)

A “Dissenter” minister in non-conformity with the authoritative Anglican Church

Urged logic as the means of telling good from evil

By age 13, had learned Latin, Greek, Hebrew, and French

Best known both then and now for 700+ widely used hymns, e.g. JOY TO THE WORLD (above)

<https://hymnary.org/hymn/PHW/III.38> (last sentence an oblique reference to logic)

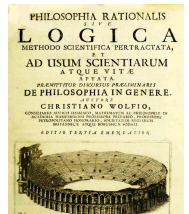
<https://archive.org/details/logicorrightuseo00watt>

TOC

But least of all can we advance,
that the study and practice of **logic** are unnecessary.
For when a man has not a distinct knowledge
of the Rules by which the understanding is directed,
he may err in the use of his natural powers;
as we have instances of those illogical reasonings,
by which learned men are sometimes led into error.

....

The artificial **logic** [syllogistic reasoning]
differs not from the natural [God given power],
but rather is a distinct explanation thereof.*



Christian Wolff

German, born Breslau, Silesia, 1679

* *Logic, or Rational Thoughts on the Powers of the Human Understanding*

Preliminary Discourse on Philosophy in General, Ontology

Prolegomena to Empirical and Rational Psychology

German Logic, Latin Logic, Metaphysics, Ethics, Cosmology

Prior to Immanuel Kant, the leading German philosopher in the Age of Enlightenment

Held that the science of logic simply describes how the mind works

Argued that for something to exist there must be a "Sufficient Reason"

Insisted that even possibilities must conform to the basic principle of logic

Unorthodox and liberal lectures and writings angered church authorities

So after 20 years, dismissed from Halle University; then even more famed at Marburg University

Gained wide acceptance and notoriety throughout Europe

Died very wealthy from lectures, professorships, and publications

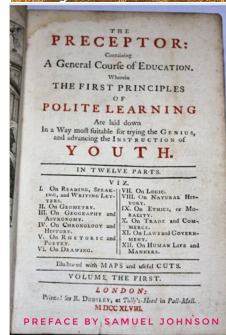
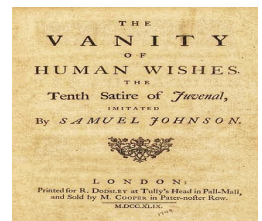
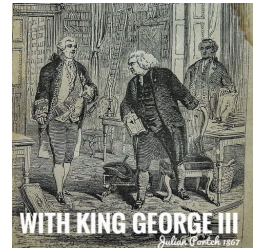
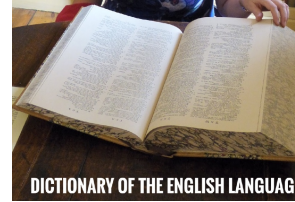
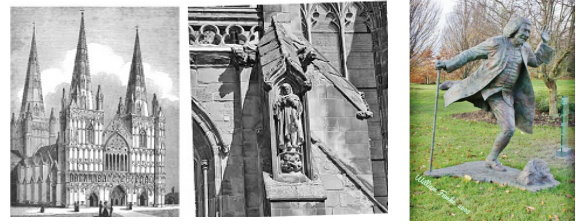
Lunar mountain named for him

<http://www.nndb.com/people/265/000103953/>

Logic or the art of arranging and connecting ideas,
of forming and examining arguments,
is universally allowed to be an attainment
in the utmost degree worthy the ambition
of that being, whose highest honour it is
to be endowed with reason.....

And therefore it will be proper
when **logic** has been once learned,
the teacher take frequent occasion,
in the most easy and familiar conversation,
to observe when its rules are preserved,
and when they are broken,
and that afterwards he read no authors,
without exacting of his pupil an account
of every remarkable exemplification
or breach of the laws of reasoning.....
And when this system has been digested,
if it be thought necessary to proceed farther in
the study of method, it will be proper
to recommend [Wolff](#), [Locke](#),
and, if further necessary, [Aristotle](#).*

LICHFIELD CATHEDRAL



Samuel Johnson

British, born Lichfield, Staffordshire, 1709

*preface to *The Preceptor* ("A Course of Education for Polite Learning")

Dictionary of the English Language (a singularly prodigious achievement, see above)

Rasselas, the Prince of Abyssinia; *Lives of the Poets*; *A Journey to the Western Highlands of Scotland*

"The Vanity of Human Wishes" (above, **required reading!**)

Scores of articles in literary magazines

Only one year at Pembroke College, Oxford, for lack of funds; later, several honorary degrees

James Boswell's *The Life of Samuel Johnson* a perpetual favorite and "must read"

Unmatchable in debate, fervently sociable, happily married, and attentive to Hodge ----->>

Ardently Anglican, but mainly moralistic, less theological

Among his many aphorisms:

You raise your voice when you should reinforce your argument.

I have found you an argument: but I am not obliged to find you an understanding.

Buried in Poets' Corner, Westminster Abbey



<https://www.neh.gov/humanities/2009/septemberoctober/feature/what-samuel-johnson-really-did>

<http://www.samueljohnsonbirthplace.org.uk>

FIND STAINED GLASS

FIND POSTAGE STAMP

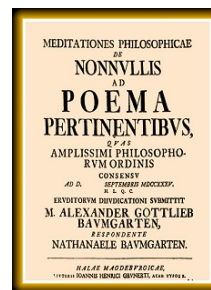
TOC

Refutation is the proof that others err.
No one refutes unless he proves thereby
another's fallacy. But if you want to prove
such things, it is clear you have to study **logic**.
When you refute, you are sure to get it wrong,
if you are no logician.*

....

The Greek philosophers and the Church fathers
have already carefully distinguished
between things perceived and things known.
It is entirely evident that they did not equate things known
with things of sense, since they honored with this name
things also removed from sense (therefore, images).
Thus, things known are to be known by the superior faculty
as the object of **logic**; things perceived are recognized
by the inferior faculty, as the object of aesthetic.
The philosopher presents his thought as he thinks it.
Hence there are no special rules, or only a few^s
that he must observe in presenting it.
He has no special interest in terms,
so far as they are articulate sounds,
for as such they belong among the things perceived.
But he who presents sensate subject matter
is expected to take much greater account of terms.
Hence that part of aesthetics which treats of such presentation
is more extensive than the corresponding part of **logic**.**

§ presumably such as [Omni et Nullo](#), [Contradiction](#)



Alexander Gottlieb Baumgarten
(no known representation)

German, born Berlin, 1714

**Philosophical Meditation* (a poem within the book)

***Reflections on Poetry*

Aesthetics, Metaphysics, Ethics, Natural Law, Lectures in Theology and Logic

Most notable in Philosophy of Beauty and coined the word “aesthetics”

Established aesthetics as a distinct field of philosophical inquiry

Strove to extract the principles of beauty from individual taste

Raised at the famous Pietist Francke Foundation Orphanage, learned Yiddish and Hebrew

Studied and lectured at the closely associated Halle-Wittenberg University

Highly regarded and influential professor at Frankfurt an der Oder

A devotee of Latin poetry

Married twice and died of tuberculosis at age 48

Immanuel Kant’s appraisal: “**a man quite rich in material and quite succinct in its execution**”

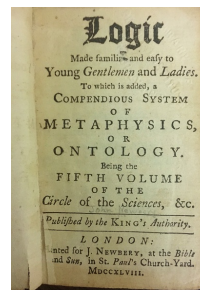
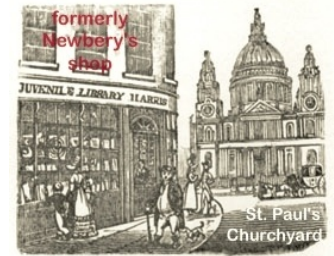
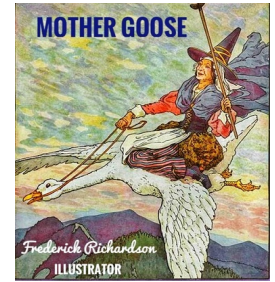
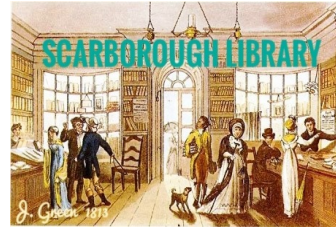
<http://frieze.com/article/beautiful-science>

Logic is not so much to teach Men
the Art of true Reasoning,
as to enable them to bring false Arguments
to a proper Trial and Scrutiny.

....

Logic is the Way
of arriving at Demonstrations
by the conclusive Form—
the Rule of Syllogism.

In the composition of Syllogisms
there must be nothing vicious in the Form,
the Rules laid down concerning them
having been allowed by the Learned
to be just and solid and agreeable
to the natural Course of Reason.*



John Newbery

British, born Waltham St Lawrence, Berkshire, 1713

**Logic Made Familiar and Easy for Young Gentlemen and Ladies*

Editor, publisher, and very likely contributing author

The Newtonian System of Philosophy

Mother Goose's Melody ; A Little Pretty Pocket-Book

The Renowned History of Giles Gingerbread The History of Little Goody Two-Shoes

Largely self-taught, yet highly knowledgeable in literature, science, religion, government, etc.

Highly successful publisher and bookseller

Remembered almost solely for his children's books with illustrations—the first ever

Eponym for the highly prized yearly Newbery Medal for children's literature

Collaborated with [Samuel Johnson](#) and Oliver Goldsmith

A sign on his storefront:

"On the first of January, being New Year's Day, Mr. Newbery intends to publish the following important volumes, bound and gilt, and hereby invites all his little friends who are good to call for them at the Bible and Sun in St. Paul's Churchyard, but those who are naughty to have none."

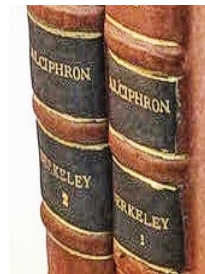
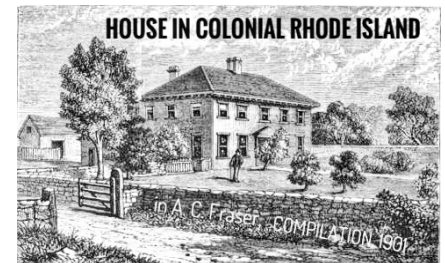
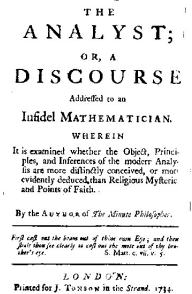
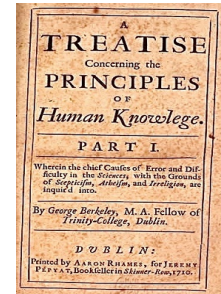
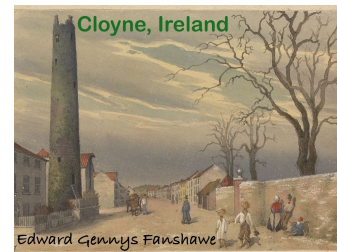
<http://18thcbrishchildreoslterature.weebly.com/john-newbery.html>

<http://books.google.com/books?hl=en&lr=&id=yzQAAAAIAAJ&oi=fnd&pg=PA1&dq=newbery,%22Logic+made+familiar%22&ots=bidWWpZgYc&sig=l9St9x4Vs9Gca9Hcd4wUNItP0rM>

The truth of the conclusion will not prove
either the form nor the matter
of a syllogism to be true:
in as much as the Illation [inference]
might have been wrong or the premises false,
and the conclusion nevertheless true,
though not in virtue of such illation
or of such premises.

I have no controversy about your conclusions,
but only about your **logic** and method.*

Surely it wouldn't be
such a deplorable loss of time
if a young gentleman spent a few months
on the much despised and decried art of **logic**,
as a surplus of **logic** is by no means
the prevailing nuisance of this age.**



George Berkeley

British, born Thomastown, County Kilkenny, Ireland, 1685

**The Analyst*

***Alciphron or the Minute Philosopher* (written in the Rhode Island colony)

An Essay Towards a New Theory of Vision

Treatise Concerning the Principles of Human Knowledge

Three Dialogues between Hylas and Philonous,

Prominent Anglican Bishop in Ireland

A major figure in the Empiricism movement

Famous for dictum: "**To be is to be perceived.**"

Dean of Derry and Bishop of Cloyne, Four years in colonial Rhode Island

Gave his church stipend and bequeathed his library to Yale University

Strove (unsuccessfully) to establish a college in Bermuda

<https://literariness.org/2019/04/22/the-philosophy-of-george-berkeley/>

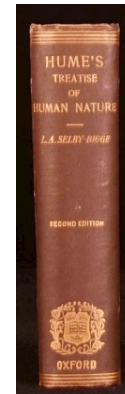
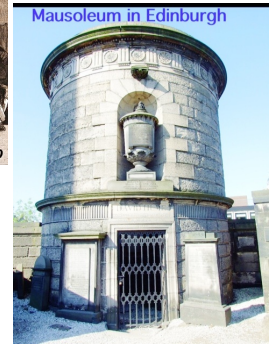
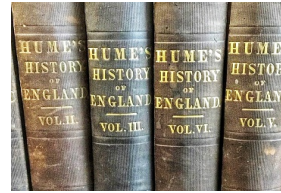
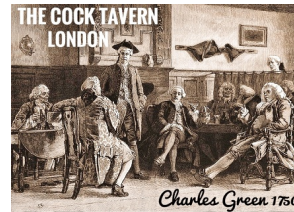
TOC

The sole end of **logic** is to explain
the principles and operations of our reasoning faculty.

....

That is a contradiction in terms;
and even implies the flattest of all contradictions,
viz. that 'tis possible for the same thing
both to be and not to be.*§

Our ideas reach no farther than our experience.
We have no experience of divine attributes and operations.
I need not conclude my syllogism.**



David Hume

British, born Edinburgh, Scotland, 1711

* *A Treatise of Human Nature* (“**fell stillborn from the press**”)

** *Dialogues Concerning Natural Religion*

An Enquiry Concerning Human Understanding, *Political Discourses*

The History of England (critically acclaimed and made Hume jolly wealthy)

Doyen of Empiricism in modern philosophy

I. e., that knowledge, error, belief, disbelief, even simple ideas are *a posteriori*

Any matter concerning morality or religion is based solely in one's senses and perceptions.

Was sometimes a private tutor, secretary, and librarian

Most prominent figure in the Scottish Enlightenment

Led a largely private life of study, reading, and writing

Regular at taverns in Scotland, England, and France

With economist Adam Smith, founder of the Edinburgh Select Society Club

Frequenter of London pugs and taverns (above)

Never held an academic position

Shrouded his personal views, since atheists and radicals were subject to trial, even codemnation

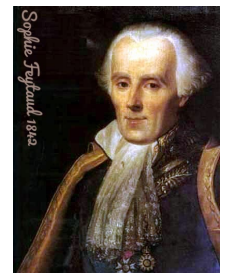
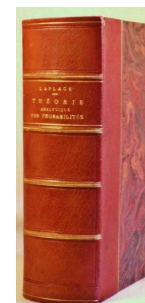
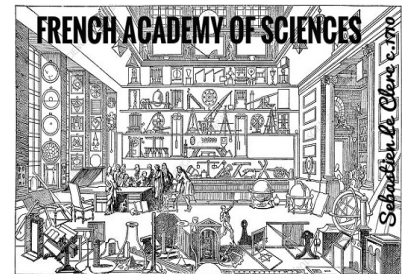
Said to show ribald drawings to friends

Lunar crater named for him

§ Curious intimation of a reality apart from perception and desire

<http://www.scottishphilosophy.org/philosophers/david-hume/>

If we consider the analytical methods
to which this theory of probabilities
has given birth
and the truth of the principles
which serve as a basis and
the fine and delicate **logic** which their employment
in the solution of problems requires,
then we shall see that there is no science
more worthy of our meditations,
and that no more useful one could be incorporated
in the system of public instruction.*



Pierre-Simon Laplace

French, born Beaumont-en-Auge, Normandy, 1749

**A Philosophical Essay on Probabilities, The World System, Celestial Mechanics*
Analytic Theory of Probabilities (dedicated to Napoleon Bonaparte)

Lecturer at l'Ecole Normale; prominent at the French Academy of Sciences (above)

Expanded the concept of logic to include probability

Narrowly escaped the guillotine in the Reign of Terror

Produced astounding advances in mathematics, physics, and astronomy

Still renowned as “the Newton of France”

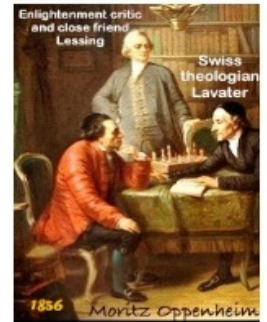
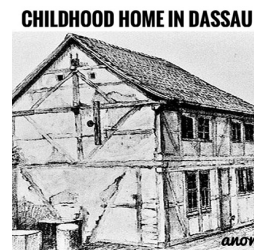
Minister of the Interior (for one month) under Napoleon Bonaparte (above)

His brain removed and on public exhibition, even put on tour!

http://books.google.com/books?id=WxoPAAAAIAAJ&pg=PR1&dq=inauthor:laplace&hl=en&ei=7oraTNKWHNiRnAfF6OT5Ag&sa=X&oi=book_result&ct=result&resnum=4&ved=0CDYQ6AEwAzgU#v=onepage&q&f=false

TOC

How much more merit
do the principles of **logic** have for the other sciences,
inasmuch as they do not rest
on judgments of the understanding and mere probability,
but are secured by evident and strict proofs.
Nor do the rules of **logic** contain anything
that leads into error, away from God's way;
for they are all too distant from the principles of religion
and from the foundations of the Torah
and have nothing to do
with commandment and prohibition.
All inhabitants of the earth, be they ever so different
in morals, opinions, and religions,
consent to the doctrines of the logicians.
Still, the purpose of this science is not
the distinguishing of truth and illusion
or of good and evil itself,
but the communication of the way
by which we arrive at the distinguishing of
truth from illusion and good from evil.*



Moses Mendelssohn

German, born Dessau, 1729

**Commentary on Moses Maimonides "Logical Terms"* (intended for Jewish teachers, but with wider import)
Jerusalem; Phädon; Morning Hours, "On the Main Principles of the Fine Arts and Sciences"
"On Sentiments"; "On Evidence in Metaphysical Sciences"; "Rhapsody"

Near equal in the Enlightenment to [Diderot](#), [Johnson](#), [Hume](#), [Montesquieu](#), and [Voltaire](#)

Self-educated in philosophy, religion, aesthetics, and government

Vigorously maintained Jewish identity despite urgings to convert

Highly regarded in Christian cultural and literary society and amongst Royals

Elegant German Torah translation

Friend and co-author with literary/cultural doyen Gotthold Ephraim Lessing

Ten children, grandfather of famed Romantic composer, pianist, conductor Felix Mendelssohn

Retained a high position in the silk trade

<https://persistentenlightenment.wordpress.com/2014/03/18/moses-mendelssohn-on-enlightening-the-mind/>

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It was natural that men should make up for the weakness of their arms
by other means which nature had placed within their reach;
and thus it is that they became mechanicians before they studied mechanics.
It is thus they were **logicians** and thought, before they investigated how man thinks.

Centuries must have passed away before men could have suspected
that thought can be subjected to laws; and even at this time
the greatest number of mankind think without conceiving how it is done. ...

However, a happy instinct which has been called talent that is only
a more certain and sensible manner of perception,
guided some strong minds without their suspecting it.

The writings of such persons became models,
and in those writings people endeavored to discover, by what artifice,
unknown even to themselves, writers produced pleasure and intelligence.

The more they astonished those who read, the more it was imagined
they possessed some extraordinary means;
and people sought to discover those extraordinary means,
while they ought to have sought simple means only. ...

Thus here we shall not begin this **logic** by definitions, axioms, or principles;
we shall begin by observing the lessons which nature gives us.

In the first part, we shall perceive that what we call analysis
is a method which we learned from nature herself;
and we shall, after this method, explain the origin and generation
either of ideas or of the faculties of the mind

In the second, we shall consider analysis in its means and effects;
and the art of reasoning will then be reduced to a well constructed language.

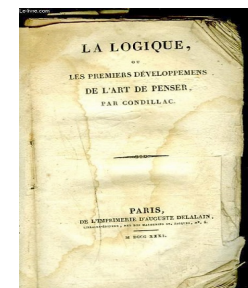
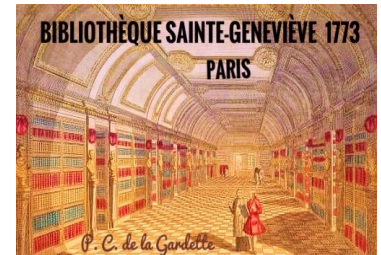
This **logic** resembles none of those which have been composed hitherto
but the new manner in which it is treated shall not be its only advantage;
it must still be the simplest, easiest, and most luminous. ...

Reflect upon the method, and reflect frequently upon it;

but no longer think of it when you want to think of any other thing.

Some day it will become familiar to you: then it will be always with you,
it will observe your thoughts, which will go alone; and it will watch over them
in order to keep them from rambling. It is all you ought to expect from the method.

Fences are not placed along the sides of precipices to make the traveler march,
but to prevent him from tumbling down.*



Étienne Bonnot de Condillac

French, born Grenoble, 1714

Essay on the Origin of Human Knowledge; Treatise on Systems; Treatise on Sensations

* *Logic* at the behest of a leading Polish aristocrat; finished less than a year before death

Ordained a priest but with a substantial family inheritance chose a life of study and writing

Always wore a cassock but reportedly said mass only once and otherwise chose not to exercise the office

Very much influenced by [John Locke's](#) *Essay Concerning Human Understanding*

Argued that man has neither innate ideas nor innate cognitive abilities

Held forth at the Paris salons and maintained a close friendship with Jean-Jacques Rousseau and Denis [Diderot](#)

Decried the Rationalism as typified by [Descartes](#) and [Spinoza](#),

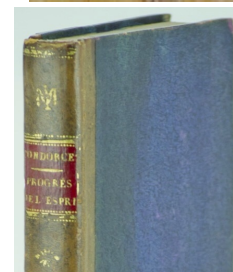
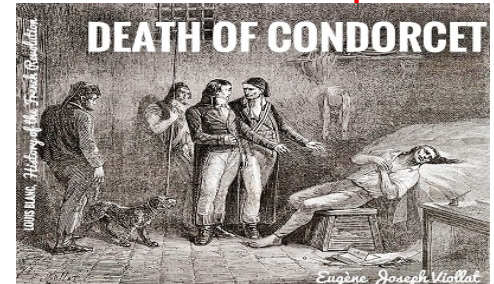
Reportedly remained a observant Catholic, although accused of Materialism—an anathema especially for a priest

Aristotle, in his **logic**,
having reduced all demonstrations to a train of arguments
drawn up in a syllogistical form,
and then divided all imaginable propositions
under four heads, teaches us to discover,
among the possible combinations of propositions
of these four classes in collections of three and three,
those which answer to the nature of conclusive syllogisms,
and may be admitted without apprehension.

In this way we may judge of the cogency or weakness
of an argument, merely by knowing to what class it belongs:
and thus the art of right reasoning
is subjected in some measure to technical rules.
This ingenious idea has hitherto remained useless;
but perhaps it may one day become
the leading steps toward a perfection
which the art of reasoning and discussion
seems still to expect.*



self-portrait



Nicolas Marquis de Condorcet

French, born Ribemont, 1743

**Progress of the Human Spirit* (written while hiding during the Reign of Terror)

On the Probabilities of Majority Decisions

“Reflections on Negro Slavery”; “On a Woman’s Right of Citizenship”; “Public Education”

Prominent promulgator of the ideas of progress and perfectibility

Significant contributor to the [Encyclopédie](#)

“Rediscovered” and refined the consensus voting methods set forth by Ramon [Llull](#) in the 13th century! (below)

High standing amongst French and European literati and Americans such as Jefferson and Franklin

Fierce in opposition to slavery and in support of women’s rights

His moderate ideas misinterpreted, was declared a traitor by the Jacobin extremists after the Revolution

Wife Sophie née Grouchy (above) a respected literary figure, artist, and salon hostess

Arrested only to die in prison, by murder(?) or suicide(?)

Famed Paris lycée (above) in his honor, graduates [Henri Bergson](#) and Marcel Proust

(Interesting ideas on voting) <http://www-history.mcs.st-and.ac.uk/HistTopics/Voting.htm>

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<http://www.nndb.com/people/882/000093603/>

<http://www.humanistictexts.org/condorcet.htm>

<http://www.enotes.com/topics/condorcet>

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This science of the necessary laws of the understanding and of reason in general, the mere form of thinking, we name **Logic**.*

Logic can't have anything empirical about it.

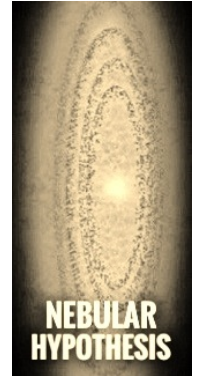
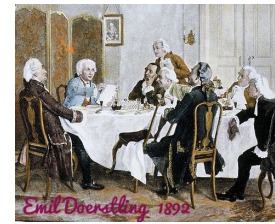
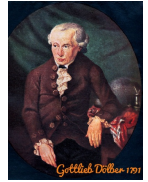
It can't have a part in which universal and necessary laws of thinking are derived from experience.

If it did, it wouldn't be **logic**, that is, a set of rules for the understanding, rules that are valid for all thinking.**

That **logic** has been so successful, is due to its advantage of limitation, by virtue of which it is obligated to abstract itself from all objects of knowledge and their differences; and in **logic**, thus, the Understanding deals with nothing more than itself and its form.

Naturally, it must be much harder for Reason to pursue the sure course of science when she has not only to deal with herself, but also with objects;.

Logic thus constitutes, only the vestibule of the sciences, and though a **logic** certainly must be presupposed for any judgment of substantive truths, these must be sought out and acquired in the sciences themselves.***



Immanuel Kant

German, born Königsberg, Prussia, 1754

**Logic*

***Groundwork of the Metaphysics of Morals*

****Critique of Pure Reason* (a work of unsurpassed genius and influence)

Prolegomena to any Future Metaphysics

Critique of Practical Reason; Critique of Judgment, On Pedagogy

Arguably the greatest philosopher since Aristotle

Demonstrated that the possibility of knowledge is not an empirical question

Held fast to Aristotle's logic:

“Logic has not gained much since Aristotle's time, indeed it cannot. Logic is in a permanent state from which it cannot undergo any change.” * §

Lived his entire life in Königsberg

Despite his genius in moral philosophy, still regarded non-Europeans as inferior

Formulated (with [Laplace](#)) the Nebular Hypothesis regarding the formation of the Solar System (above)

Famous for self-discipline and extreme punctuality

Lunar crater named for him

§

Despite this encomium, and despite even his own non-recognition of it, Kant's *Critique of Pure Reason* utterly transfigured the basis of (and the face of) logic and brought on its rapid evolution ever since.

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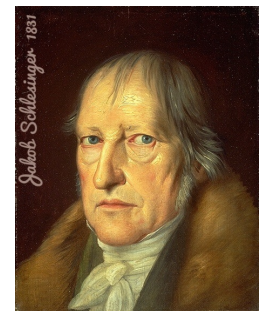
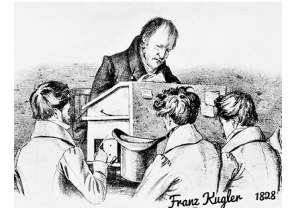
By studying **logic**, your mind acquires self-reliance and independence.
You become at home in abstractions
and you can progress
using ideas that are free from
the coming and going of the moment.
You develop an unsuspected power
of assimilating in rational form
all the complex branches of knowledge.

....

By studying **logic**
you begin to grasp and retain
the essential character
of all the sciences, stripping them
of their external features
and in this way
extracting the **logical** element
they hold in common.*



Žgidiens-Gymnasium Nuremberg



Georg Wilhelm Friedrich Hegel

German, born Stuttgart, Württemberg, 1770

**Science of Logic* (published while headmaster, Žgidiens-Gymnasium, Nuremberg)

Phenomenology of Spirit, *Encyclopedia of the Philosophical Sciences*

Elements of the Philosophy of Right

Prominent figure in the history of philosophy

Eminent professor at Jena, Heidelberg, and Berlin

Writings are highly complex, difficult, and rather murky

Held that logical form is its own content

Being and Becoming central to all philosophy, including logic

While upholding white superiority, supported peaceful progress toward freedom and equality

Witnessed and was impressed by Napoleon's triumphal march through Jena (above)

Died in the cholera epidemic of the 1830s

Hegel's last words: "**They didn't understand me.**"

<http://www.sparknotes.com/philosophy/hegel/section4.rhtml>

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<http://hegel.net/en/hegelbio.htm>

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Knowledge of **logical** rules will not indeed supply the want of other knowledge; nor was it ever proposed, by any one who really understood this science, to substitute it for any other : but it is no less true that no other can be substituted for this; that it is valuable in every branch of study; and that it enables us to use to the greatest advantage the knowledge we possess. *

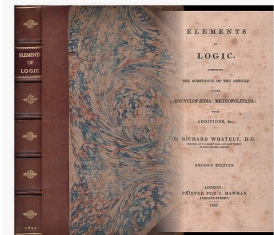
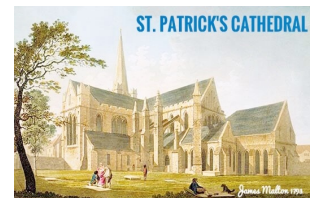
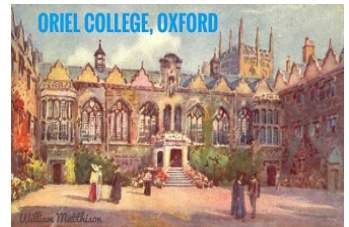
If such an **[illogical]** argument as this be proposed,
“every rational agent is accountable;
brutes are not rational agents;
therefore they are not accountable”,
there are some, perhaps, who would not perceive any fallacy in such an argument, especially when the conclusion is true, and others might perceive indeed, but might be at a loss to explain the fallacy.

Now the argument exactly corresponds with the following, the absurdity of the conclusion from which is manifest:

“every horse is an animal;
sheep are not horses;
therefore they are not animals”

[This] corresponds exactly (considered as argument) with the former; the question respecting the validity of an argument being, not whether the conclusion be true, but whether it follows from the premises adduced.

This mode of exposing a fallacy, by bringing forward a similar one whose conclusion is obviously absurd, is often very advantageous.* §



Richard Whately

British, born London, 1787

**Elements of Logic* (standard logic text at Oxford for several decades)

“Easy Lessons on Reasoning” (in a magazine, anonymously, during early fellowship at Oriel College)

The Use and Abuse of Party Feeling in Matters of Religion

Letters on the Church, by an Episcopalian

Introductory Lessons on Morals and Christian Evidences

Archbishop of Dublin (St. Patrick's Cathedral, above)

Theologian, educator, moralist, economist, reformer, social activist, and historian

Crossed his legs in a very odd way, and often seen accompanied by a very large white dog

§ see similar by [Jevons](#) and [Peter of Spain](#)

This link is to Whately's influential text book. We recommended the Preface, as it is a well-crafted expression of the importance of Logic.

<http://www.archive.org/details/elementslogicco12whatgoog>

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It is the task of **logic** to give rules
which apply simultaneously
to a whole class of truths.

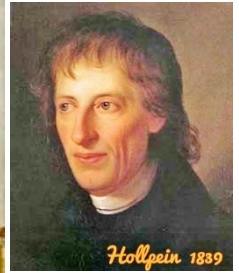
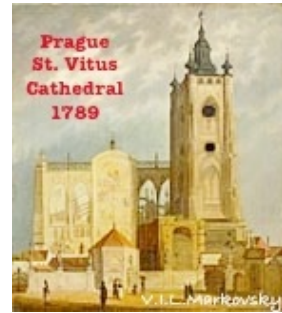
For this reason, **logic** never concerns
a particular, fully determinate proposition,
but rather, a whole class of propositions at once.

If these classes of propositions
are to be called general forms of propositions,
then it is permissible to say
that **logic** is concerned with forms
rather than with individual propositions.

...

If the mere clear representation of a proposition M
does not lead to a judgment about it,
or if this judgment does not appear reliable enough,
the next stage in its testing is that we attempt to deduce,
either from M alone, or from M together with
other already known premises,
several consequences and from these further consequences.

If we recognize any one of these consequences as false,
then we are entitled to the conclusion
that our tentative hypothesis M itself is false.*



Bernard Bolzano

Bohemian, born Prague, 1781

* *Theory of Science, a Detailed and Novel Exposition of Logic*
Contributions to a Better-Grounded Presentation of Mathematics
Treatise of the Science of Religion, Paradoxes of the Infinite

Logician, mathematician, philosopher, theologian, Catholic priest

Recognized as the greatest logician between Leibniz and Frege

Professor Ordinaire at Charles University, Prague

Anti-military and social reform views angered faculty/church authorities

Hence expelled, forbidden to publish, and chose to leave the city

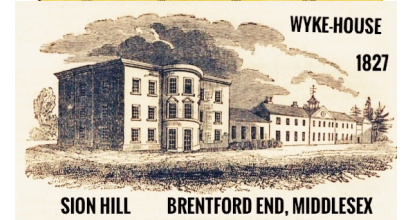
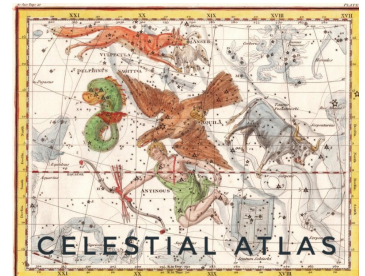
But granted a Royal pension, could totally devote himself to scholarship

Argued that propositions are abstract, true or false, mind-independent objects

And that these objects are the content of judgments and the meaning of sentences

Prodigious writings fill 90 large volumes

His work largely “re-accomplished” decades later, thus obscuring his genius



AT WYKE-HOUSE,
YOUNG GENTLEMEN ARE BOARDED AND EDUCATED
For the Universities of Oxford and Cambridge,
THE PUBLIC SCHOOLS,
THE NAVAL AND MILITARY ACADEMIES OF PORTSMOUTH,
WOOLWICH, SANDHURST, AND ADISCOMBE,
AND FOR THE LEARNED PROFESSIONS OR MERCANTILE PURSUITS,
conducted by **ALEXANDER JAMIESON, LL.D.**
Pupils under Ten Years of Age.....60 }
From Ten to Fifteen Years of Age.....70 } Guineas
Above Fifteen Years of Age.....80 } per annum.



Alexander Jamieson
(no known representation)

British, born Rothesay, Isle of Bute, 1782

**A Grammar of Logic and Intellectual Philosophy*, many UK and USA editions

Celestial Atlas, highly regarded, widely used, even splendid color plates (above)

A Grammar of Rhetoric and Polite Literature, several more textbooks

Marischal College, Aberdeen, M.A. and LL.D.

St. John's College, Cambridge, [Ten-Year-Man](#) and [sizar](#), apparently no degree

Public schools: Headmaster at Wyke-House; resident scholar at Heston-House

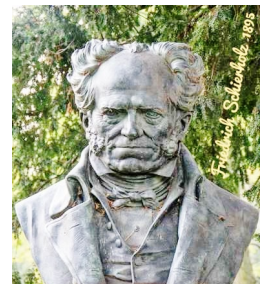
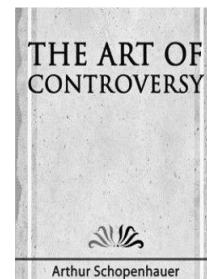
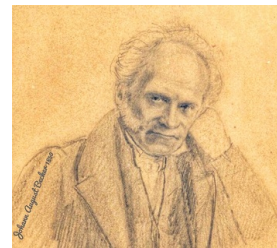
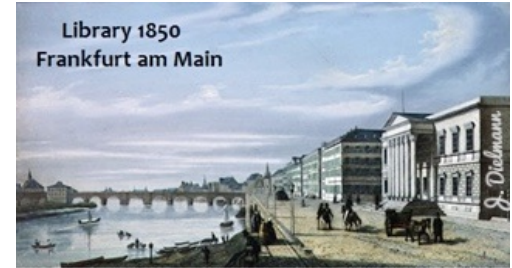
Both schools failing, became an itinerant actuary, died impoverished in Belgium

<https://archive.org/details/grammaroflogicin00jami>

<https://archive.org/details/dictionaryofmech01jami>

<https://www.abebooks.com/blog/index.php/2018/07/05/jamiesons-heavenly-celestial-atlas-from-1822/>

It is clear that **logic** deals with a subject
of a purely a priori character,
separable from experience,
namely, the laws of thought
which reason follows when it is left to itself.
Yet, though it is concerned
with the mere form,
logic has objective truth.*



Arthur Schopenhauer

German, born Danzig, 1788

**The Art of Controversy—Logic and Dialectic*

The World as Will and Representation, On the Will in Nature

The Freedom of the Will, Foundations of Morality

Was much influenced by the *Upanishads* doctrine that there are no values in blind nature

Most productive years in Dresden

Stressed that our Will-to-Power creates illusions over which we are virtually powerless

“The most rational philosopher of the irrational” (Thomas Mann)

Having a family inheritance, never held a professorship nor had any vocation

Gave sparsely attended lectures at several universities

Was a life-long pacifist

Spent his last 35 years mostly alone in Frankfurt am Main with his pet dogs

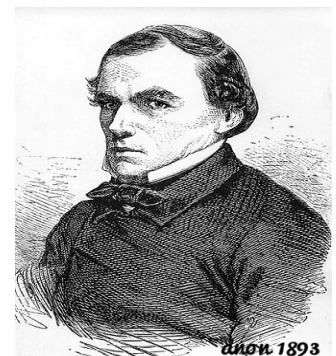
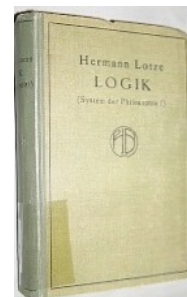
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Logic [*broadly*] is not concerned with the manner in which the elements utilized by thought come into existence, but with their value, when they have somehow or other come into existence, for the carrying out of intellectual operations...

Pure or formal logic is devoted to thought in general and those universal forms and principles of thought which hold good everywhere, both in judging of reality and in weighing possibility, irrespective of any difference in the objects.*

I only wish to remind the reader of the ease with which a thirst for knowledge is, to its own injury, often satisfied by being merely taught how

to bring a particular case under its universal;
of the ineradicable desire to make events and conditions intelligible by reference to their place in some system of classification, even when it happens that their true nature can only be understood by reference to the co-operation of their special conditions;
of the whole mass of timid or presumptuous **logic** which has introduced such a variety of sophisms into the treatment of Nature and of life at one time being brought to a standstill by the most insignificant distinctions of objects, and even demanding different treatment for different kinds of relations, at another time passing lightly over innumerable differences, and requiring a similar treatment of everything which may by some remote possibility be brought under the same generic concept.**



Hermann Lotze

German, born Bautzen, Saxony, 1817

**Logic: In Three Books* (trans. [Bernard Bosanquet](#))

***Microcosm* (trans. [Constance Jones](#))

Philosopher and both a practicing and research physician

Concurrent professorships in Philosophy and Medicine at Leipzig and Göttingen

Led the move away from abstract idealism and toward an objective approach to philosophy

Strongly opposed reducing logic to empirical psychology

Held that sound philosophy should not (indeed cannot) reject scientific facts

A skilled linguist, writing in German, French, Latin, and English

His lectures attended by [Gottlob Frege](#)

Also a published poet

<https://books.google.com/books?id=A5tRAAAAMAAJ&pg=PA1&lpg=PA1&dq=lotze+philosopher&source=bl&ots=MbsW4wKhC&sig=ACfU3U0RAst9yL1nXrEQ25z3awKWbE45w&hl=en&sa=X&ved=2ahUKEwjtyaua79LrAhXZIHIEHoUDa04HhDoATAADegQICRAB#v=onepage&q=lotze%20philosopher&f=false>

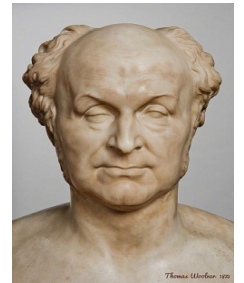
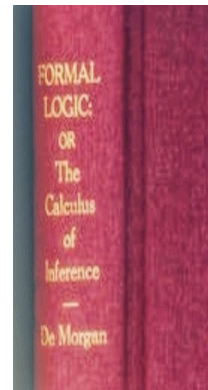
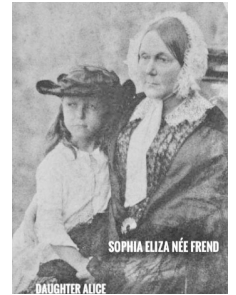
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It is very commonly said that studies which exercise the thinking faculty, and especially mathematics, are means of cultivating **logic**, and may stand in place of systematic study of that science. This is true so far, that every discipline strengthens the logical power: that is to say, strengthens most of what it finds, be the same good or bad. It is further true that every discipline corrects some bad habits...and tends to confirm some bad habits. Accordingly, though every exercise of mind does much more good than harm, yet no person can be sure of avoiding the harm and retaining only the good, except by.... a proper study of **logic** and is seldom made without it.*

It is not therefore the object of **logic** to determine whether conclusions be true or false, but whether what are asserted to be conclusions are *conclusions*.

By a *conclusion* is meant that which is and must be shut in with certain other things put in first.

It is that which must have been put into a sentence because certain other things were put in.**



Augustus De Morgan

British, born Madurai, India (a British subject), 1806

**Syllabus of a Proposed System of Logic*

***Formal Logic or The Calculus of Inference*

First Notions of Logic, The Elements of Arithmetic, An Essay on Probabilities

Memoir of Augustus De Morgan, by his wife Sophia Eliza née Frend (link below)

Professor of Mathematics and Logic at University College London

Joined with Eliza in prolonged and serious investigations in spiritualism

Bequeathed De Morgan's Law and advanced the logic of relations

Accomplished flautist and, briefly, a lawyer

Friendship with neighbor Charles Dickens via Eliza's efforts as a social reformer

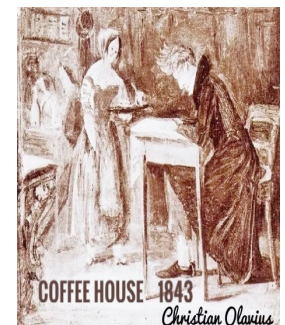
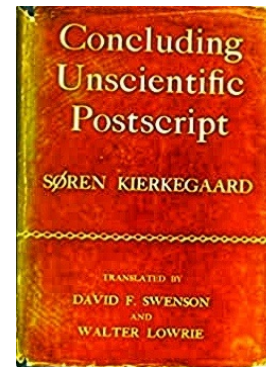
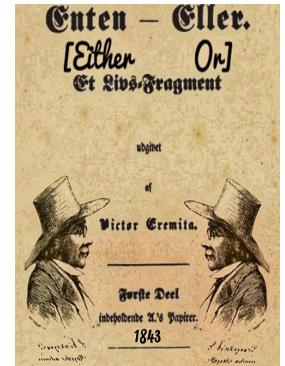
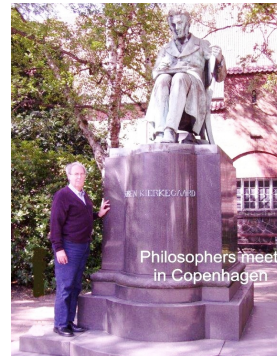
Never felt comfortable anywhere outside of London

<http://archive.org/stream/memoiraugustusd01morggoog/#page/n10/mode/2up>

<http://www.gutenberg.org/dirs/etext06/tbmms10p.pdf>

[2nd lecture]

In a **logical** system, nothing must be taken on that has a relation to life itself, nothing that is not indifferent to existence. The infinite advantage over all other thinking held by the **logical**, by being objective, is limited in turn by the fact that, seen subjectively, it is a hypothesis just because it is indifferent to life in the sense of actuality. This double nature of the **logical**, the objective and the hypothetical, work together as the unity and the contradiction in which it relates negatively to existence.*



Søren Kierkegaard

Danish, born Nytorv 1813

* *Concluding Unscientific Postscript*

Either/Or; Fear and Trembling; The Sickness Unto Death; Practice in Christianity

Passionately critical in rejecting the prevalent idealism stemming from Hegel

Allowed that science explains by observation, but denied that observation can grasp our spirit

Often published under a pseudonym (see *Either Or*, above)

Frequent long walks in the back streets of Copenhagen (above)

Strived to discover how to become a Christian while engulfed in the false institution of Christendom.

Subsequently enshrined as the Father of Existentialism

“Søren Kierkegaard was by far the greatest thinker of the nineteenth century.”... [Ludwig Wittgenstein](#)

“ ‘We live forward, we understand backward’, said Kierkegaard”. [William James](#)

<http://denmark.dk/en/meet-the-danes/great-danes/writers/soeren-kierkegaard/>

<https://archive.org/details/kierkegaardsatta00kier>

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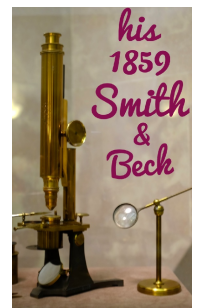
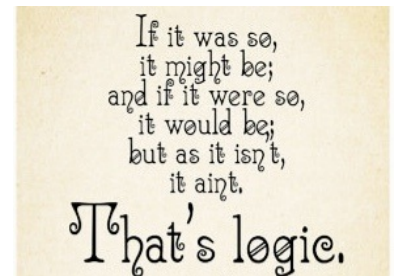
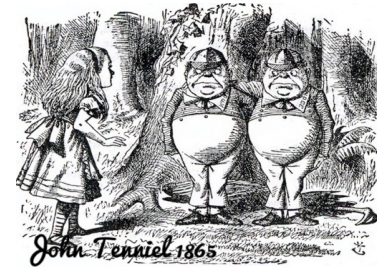
If possible, find some genial friend,
 who will read the book along with you,
 and will talk over the difficulties with you.
 Talking is a wonderful smoother-over of difficulties.
 When I come upon anything—in **Logic**
 or in any other hard subject—that entirely puzzles me,
 I find it a capital plan to talk it over, *aloud*,
 even when I am all *alone*.
 One can explain things so clearly to one's self!
 And then, you know, one is so patient with one's self:
 one never gets irritated at one's own stupidity!

....

Once master the machinery of Symbolic **Logic**,
 and you have a mental occupation always at hand,
 of absorbing interest, and one that will be of real use
 to you in any subject you may take up.
 It will give you clearness of thought
 the ability to see your way through a puzzle
 the habit of arranging your ideas in an orderly and get-at-able form,
 and, more valuable than all, the power to detect fallacies,
 and to tear to pieces the flimsy **illogical** arguments,
 which you will so continually encounter in books,
 in newspapers, in speeches, and even in sermons,
 and which so easily delude those
 who have never taken the trouble to master this fascinating Art.

...

I claim, for Symbolic **Logic**, a very high place
 among recreations that have the nature of games or puzzles
 and I believe that anyone, who will really try to understand it, will find it
 more interesting and more absorbing than most games or puzzles yet invented:
 the real occupation and the real enjoyment come when the reader has gained
 the power of solving for himself the fascinating *problems* of Science.
 And this power is far sooner, and far more easily, acquired
 in Symbolic **Logic**, than it is in the Science as taught in the ordinary text-books.*



Charles Lutwidge Dodgson

British, born Daresbury, Cheshire, 1832

**Symbolic Logic*

Alice's Adventures in Wonderland

Through the Looking-Glass

Mathematics Lecturer at Christ Church, Oxford

Wrote advanced logic texts and logic puzzle books

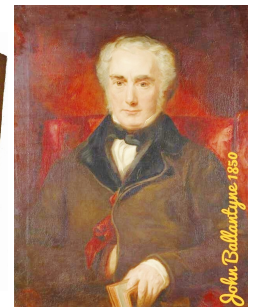
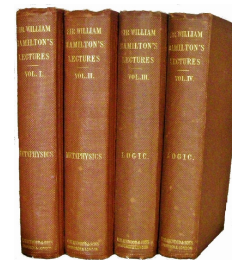
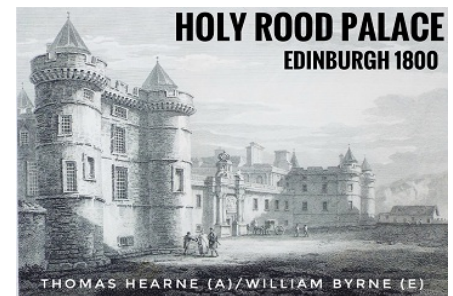
Better known then and now as Lewis Carroll

Excellent at charades, accomplished photographer, and inveterate microscopist

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As the rules of **logic** do not regard the matter
but only the form of thought,
the utility of **logic** must, in like manner,
be viewed as limited to its influence
on our manner of thinking, and not sought
for in any effect it can exert upon what we think about.
It is, therefore, not to be considered useful
as a mean of extending our knowledge
by the discovery of new truths;
but merely as a formal instrument, that is, as a mean
by which knowledge, already acquired,
may be methodized into the form
accommodated to the conditions of our understanding.....
Another utility is, that **logic** alone affords us
the means requisite to accomplish a rational criticism,
and to communicate its results.*

cf. [Gassendi](#), [Pascal](#), [Minto](#), [Popper](#)



William Hamilton

British, born Glasgow, Scotland, 1788

**Lectures on Modified Logic*

Discussions on Philosophy and Literature, Education, and University Reform

Notes and Dissertations, Lectures on Metaphysics and Logic

Scientist, logician, historian, philosopher

Formulated ground-breaking ideas concerning logical form and relational predicates

Championed the use of psychology in education

“A man of true and rare inventive genius” (in obituary by [Augustus De Morgan](#))

Salary as professor at the University of Edinburgh came from a local tax on beer

<http://www.bartleby.com/224/0105.html>

<http://www.archive.org/details/chaptersinlogicc00hamiuoft>

READ TOMBSTONE INSCRIPTION

TOC

In every enterprise
the mind is always reasoning,
and, even when we seem
to act without a motive,
an instinctive **logic** still directs the mind.

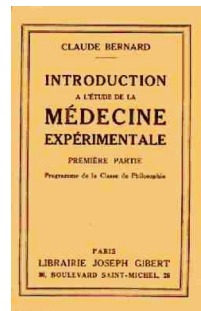
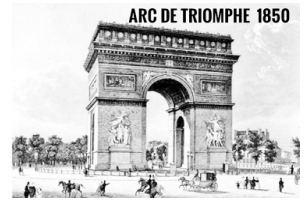
Only we are not aware of it,
because we begin by reasoning
before we know or say
that we are reasoning,

just as we begin by speaking
before we observe that we are speaking,
and just as we begin seeing and hearing
before we know

what we see or what we hear.....

The experimenter forces nature to reveal itself
by attacking it and asking it questions
in all directions; but he should never answer for her
nor listen to her answers incompletely,
taking from experiment only that part of the results
which favor or support a hypothesis.....

When a fact that emerges
contradicts a prevailing theory
we accept the fact and abandon the theory,
even when the theory is generally accepted.*§



Claude Bernard

French, born Saint-Julien, 1813

**An Introduction to the Study of Experimental Medicine*

Physiologist and historian of science at Collège de France

Formulated the method of “blind experiment”

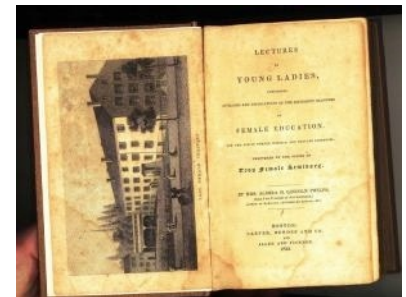
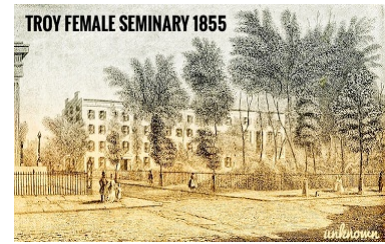
Wrote vaudeville comedy sketches

France’s first public funeral for a scientist

§ cf. [Popper](#), [Hamilton](#), [Minto](#), [Pascal](#)

http://www.cerebromente.org.br/n06/historia/bernard_i.htm

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Almira Hart Lincoln Phelps

American, born Berlin, Connecticut, 1793

**The Female Student, Lectures to Young Ladies*, #23

Natural Philosophy; Our Country; Lectures on Botany; Progressive Education; Hours With Students. ...more

Virtual co-founder (with her sister Emma) of Troy Female Seminary (later Emma Willard Preparatory School)

Youngest of 17 children, extensive home schooling, opened her own school at age 18, yet denied college entrance

Second woman member of the American Association for the Advancement of Science (1859)

Principal at Petapsco Female Institute in Maryland

Maryland Women's Hall of Fame (2010)

Incredibly, a staunch opponent of women's suffrage

§ This view of logic which is still widely prevalent in general education merits comment.

Formal logic is easily regarded as barren if seen as a way of advancing knowledge, but it is wrong to suppose that logic must thus be more relaxed and informal.

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What is **Logic** ?

Logic is a science which teaches us how to think, reason, judge—to discover truth and to communicate it to others; it is, as it were, the key to all the other sciences.

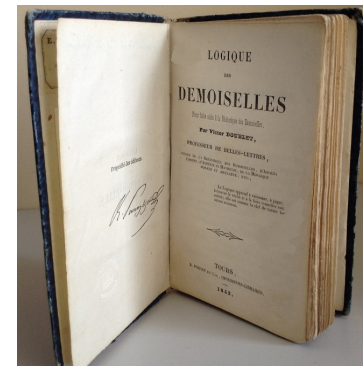
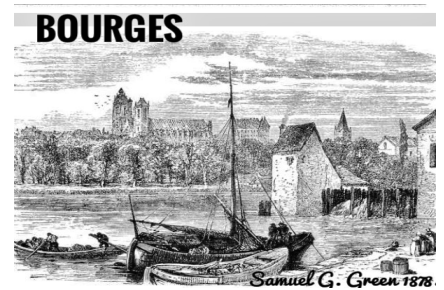
...Up to now, the science of **logic** has been sealed in learned tomes, thus depriving young ladies of facility in learning it, at least until they entered the highest classes; and since few complete the full course of studies at academies, **logic** has been not been acquired.

This should not be.

Women have as much need of **logic** as the sterner sex.

Moreover, as women are deemed prone to frivolity, they should be early accustomed to reflect, to render an account of their thoughts, and draw proper conclusions. They will then be capable of sowing the seeds of sound **logic** in those whom their position obliges them to instruct.

Let young ladies beware of being repelled by the difficulties and dryness which they discover in the pursuit of **logic**; for the highest and the most abstract sciences have been grasped by the gentler sex, and many ladies have attained fame in the pursuit of profound learning.*



French, born Orléans, 1806

Victor Doublet

**Logic For Young Ladies* (a remarkably prescient publication)

The Rights, Duties, and Interests of French Citizens, New Collection For Dictation Graduates

A Practical Course on the Subjects and Development of Letters and Essays

A Family Guide in Choosing Careers for Children

The Benefactors of Humanity, The Real Treasure of the People

Wonderful Secrets of Nature, Medicine, Industry, Science, Art, Thoughts and Kind Words

even instructs the proper ways to preserve apricots, raise pigs, polish silver, and kill rats

Inventor and well regarded for popularizing science and education

Professor of Belles Lettres and Foreign Languages in Bourges

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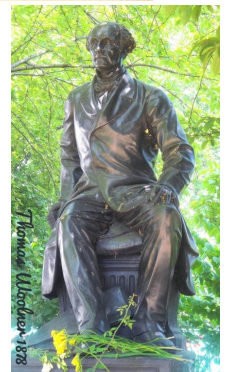
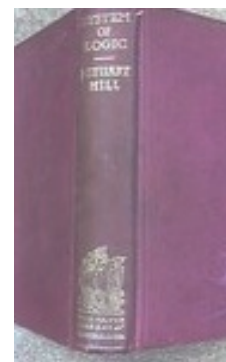
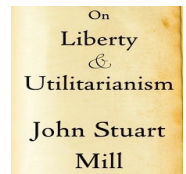
I am persuaded that nothing in modern education,
tends so much as **logic**,
when properly used, to form exact thinkers.*

In so far as belief
is to be founded on proof,
the office of **logic** is to supply a test
for ascertaining whether or not
the belief is well founded.**

It is universally allowed that a syllogism is vicious
if there be any thing more in the conclusion
than was assumed in the premises.

But this is, in fact, to say,
that nothing ever was, or can be, proved by syllogism,
which was not known, or assumed to be known, before.

....It must be granted that in every syllogism
considered as an argument to prove the conclusion,
there is a *petitio principii* [begging the question].**§



John Stuart Mill

British, born London, 1806

**Autobiography*; *Principles of Political Economy*

***System of Logic* (Laying out new logical models for gaining knowledge through experience)

On Liberty—Individual freedom, democratic but limited government

Utilitarianism—Ethics based on consequences and happiness

Home schooled and never attended college (except an aborted attempt at Law)

A philosopher of paramount impact ever since

Argued, wrote, and worked for equality: economic, racial, sexual, religious—the lot

Elected MP, proposed Proportional Representation and Women's Suffrage

Flatly rejected by Commons; his 'logic' lampooned in *Punch* (cartoon above)

Son of famed James Mill, economist, penal reformer, historian

Godfather to [Bertrand Russell](#)

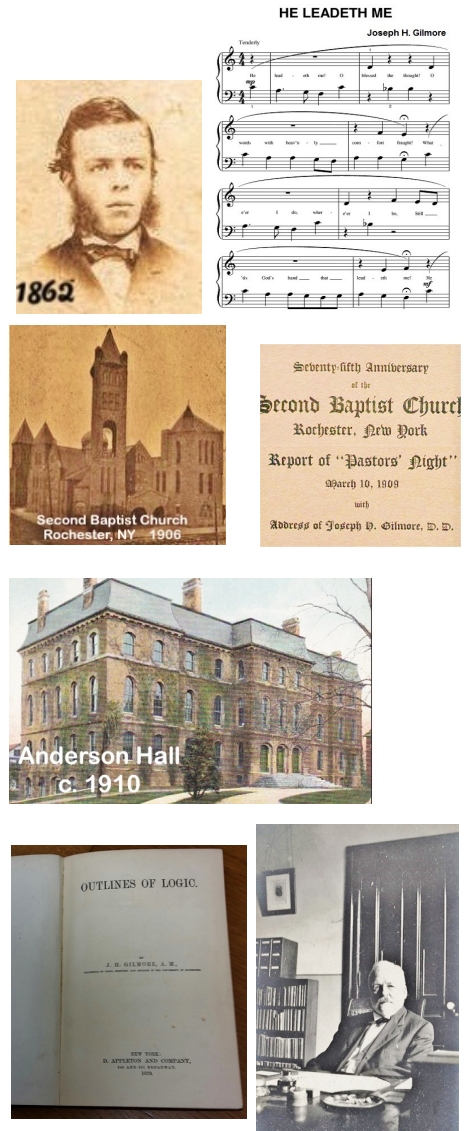
§ A persuasive (though controversial) critique of Aristotelian logic, yet anticipated by [Pierre Gassendi](#) 200 years prior

<http://www.bartleby.com/224/0108.html>

Logic has to do exclusively with the form
not at all with the matter of thought.

....

Both the inductive and the deductive processes
fall within the scope of **logic**,
but it is the deductive process
which **logic** has until recently especially emphasized.
The tendency now is to attach
equal if not superior importance to inductive **logic**
and this tendency is doubtless in the right direction.*



Joseph Henry Gilmore

American, born Boston, Massachusetts, 1834

**Outlines of Logic*

The Art of Expression, Familiar Chats on Books and Reading

Outlines of English and American Literature

Ordained Baptist minister

University of Rochester professor of Theology, Rhetoric, Logic, Hebrew, and English

At age 28, wrote the still widely used hymn "He Leadeth Me" (See first link below)

Inspired by 23rd Psalm and about which he later wrote:

"It was the darkest hour of the Civil War. I did not refer to that fact—that is, I don't think I did—but it may sub-consciously have led me to realize that God's leadership is the one significant fact in human experience that it makes no difference how we are led, or whither we are led, so long as we are sure God is leading us."

<http://www.youtube.com/watch?v=ZdUIhek7swo>

http://books.google.com/books?id=GK4RAAAAYAAJ&printsec=frontcover&dq=intitle:logic&source=bl&ots=Eqxo9jr0AV&sig=WaMF_AxEcVsQg_j56m9TggeJV8Q&hl=en&sa=X&ei=PEWAUIO9L4269gSTsIDQAg&ved=0CEYQ6wEwAg#v=onepage&q&f=false

Strictly speaking, **logic** has nothing to do
with a proposition by itself;
it is only in converting or transmuting
certain propositions into certain others
that the work of reasoning consists,
and the truth of the conclusion
is only so far in question
as it follows from the truth of the premises...
If the following were put forth as an argument
it would be evidently absurd:
Sirius is not a planet.
Planets are not self-luminous.
Therefore Sirius is not self-luminous.[§]
Both the premises given are true,
and yet the conclusion is false,
for all the fixed stars are self-luminous.*



Logic Piano



William Stanley Jevons

British, born Liverpool, 1835

**Elementary Lessons on Logic* (soon a widely used textbook)

The Theory of Political Economy (highly influential down to the present day)

The Principles of Science (masterstroke of scientific methodology and induction)

Early years in Australia formed his basic ideas on logic and scientific method

Student of [Augustus De Morgan](#)

Built a logic machine, the **Logic Piano**, forerunner to Babbage's Analytic Engine

In economics, argued that value is simply the utility a product affords the buyer

As a Unitarian, was barred from the Universities of Oxford and Cambridge!

Tutor Owens College, Manchester, graduate/Professor at University College, London

Enjoyed travel, photography, music, and most of all swimming

Drowned swimming in the English Channel off Hastings, East Sussex

[§] Though obviously invalid, this argument is pedagogically ineffective,
since virtually no one would set forth an argument with this logical form. Better would be:
"Sirius is not the North Star; The North Star is self-luminous; thus Sirius not self-luminous."

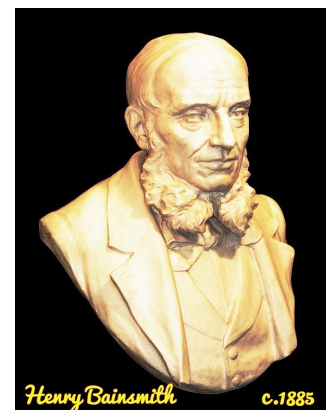
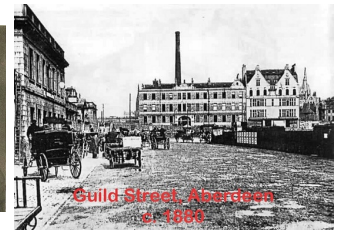
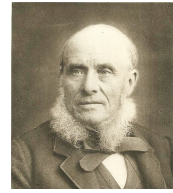
see similar by [Whately](#) and [Peter of Spain](#)

TOC

Logic embraces, the most fundamental
and universal of all principles:
Consistency, Deduction, and Uniformity.

It reposes upon
nothing more fundamental than itself,
and it gives foundation
to all the other sciences.
There can be no science without assuming
all the data of **logic**,
whether avowedly or not.*

Logic is nothing, if not training.
The information mixed up with it
is all to be used for training purposes.
It is the element of scientific form,
which is more thoroughly impressed
by being singled out for special consideration.
It is the grammar of knowledge.*



Alexander Bain

British, born Glasgow, Scotland, 1818

**Logic: Deductive and Inductive* (highly respected textbook of the time)

The Senses and the Intellect (first ever and standard psychology text for over a half century)

The Emotions and the Will; Mental and Moral Science; Education as a Science

Regius Professor of Logic at the University of Aberdeen

Held (controversially) that logic is grounded in psychology

Stressed the application of logic to all fields of study, including education

Showed how the principles of logic apply, specifically, in the various sciences

Originated “scientific psychology”: the linkage between anatomy/physiology and psychology

Emphasized the importance of conscious movement

Led toward the functionalist psychology of adaptive behavior

Brought forward Psychological Parallelism—still an unopposed given principle

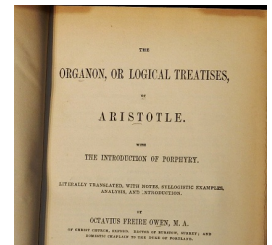
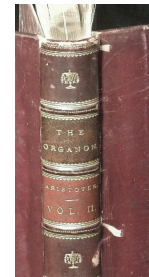
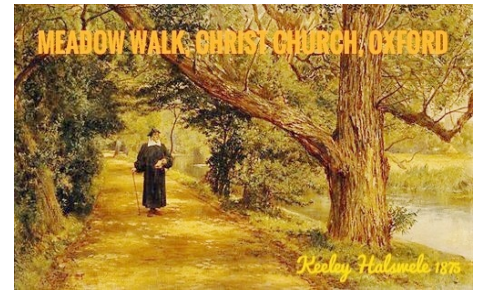
Advocated new education methodologies (such as “incentive/reward”)—many employed ever since

Founded (and funded) *Mind*—still the archetype journal for Philosophy and Psychology

Self-disciplined in the extreme: a set time each day to: rise, eat, bathe, read, nap, write, exercise, bed, etc.

<http://fair-use.org/mind/1904/01/notes/professor-bain>

It is sufficient that **logic**,
without entering into
all the phenomena of mind,
provides certain forms which a judgment,
to be legitimate, must exhibit,
certain tests by which fallacy may be detected,
and certain barriers
against ambiguity in the use of language.*



Octavius Freire Owen
(no known representation)

British, born Edmonton, Middlesex, 1816

*Introduction to his translation: *The Organon of Aristotle, with Porphyry's Isagogue*

(first complete modern English translation, with extensive notes and even exercises)

The Fables of John Gay (with memoir, introduction and annotations by John Gay)

A Refutation Recently Discovered of Spinoza by Leibnitz

M. A., Christ Church, Oxford

Ordained deacon and priest

At various times, Vicar of Childswickham, Rector of Burstow, and Chaplain of the Duke of Portland

Fellow of the Society of Antiquaries

Wife Emily Montague, author of still very well worth reading feminist fiction and non-fiction: (see 2nd link)

The Heroines of Domestic Life

The Heroines of History

Raised to the Peerage

Ten children

<http://archive.org/details/organonorlogica00porpgoog>

<http://catalog.hathitrust.org/Search/Home?lookfor=%22Owen, Actives Freer, Mrs.%22&type=author&inst=all>

TOC

Why describe **logic** as a system of defense against error?
Why say that its main end and aim is the
organization of reason against confusion and falsehood?
Why not rather say, as is now usual,
that its end is the attainment of truth?
Does this not come to the same thing?

....

Substantially, the meaning is the same,
but the latter expression is more misleading.

To speak of **logic** as a body of rules
for the investigation of truth has misled people into supposing
that **logic** claims to be an art of discovery,
that it claims to lay down rules by simply observing
which investigators may infallibly arrive at new truths.
Now, this does not hold even of the **logic** of induction,
still less of the older **logic**, the precise relation of which
to truth will become apparent as we proceed.

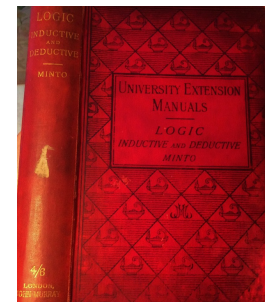
It is only by keeping men from going astray and by disabusing them
when they think they have reached their destination
that **logic** helps men on the road to truth.

Truth often lies hid in the centre of a maze,
and logical rules only help the searcher onwards by giving him warning
when he is on the wrong track and must try another.

It is the searcher's own impulse that carries him forward:
Logic does not so much beckon him on to the right path
as beckon him back from the wrong.

In laying down the conditions of correct interpretation,
of valid argument, of trustworthy evidence, of satisfactory explanation,
logic shows the inquirer how to test and purge his conclusions,
not how to reach them.* §

§ cf. passages by [Cicero](#), [Poincaré](#), and [Popper](#)



William Minto

British, born Auchintoul, Aberdeenshire, Scotland, 1845

* *Logic, Inductive and Deductive*

Literature of the Georgian Era

Crack of Doom a somewhat well received novel in Britain and America

Successor to [Alexander Bain](#) at the University of Aberdeen

Though Regius Professor of Logic, was much more inclined to Literature

Lectures and books on Pope, Dryden, Defoe, Wordsworth, Byron, Shelley, Keats. and others

Prolific contributor to the *Weekly Examiner*, *Encyclopedia Britannica*, and other literary publications

Deemed it degrading to allow himself to be given electric shock just for a classroom demonstration

Was thus dismissed from his Natural Philosophy [science] assistantship

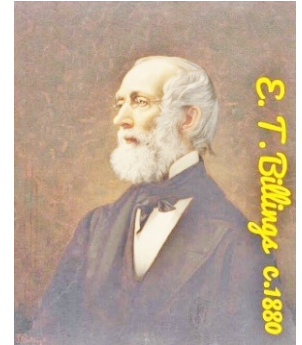
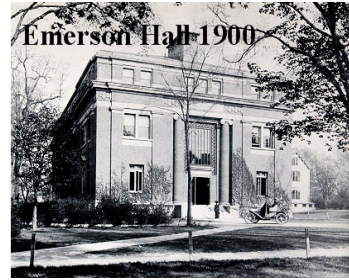
Enjoyed golf at Cruden Bay (above)

<https://archive.org/details/logicinductivea01mintgoog/mode/2up>

[see excellent "Biographical Introduction", especially pages xii-xiii and impressive obituary POEMS](#)

TOC

The intimate connection
between Thought and Language
has caused some writers
to maintain that **logic**
is entirely conversant about Language
But it is not so,
for **logic** is primarily and essentially
conversant with thought
and only secondarily and accidentally
with language.
That is, **logic** treats of language
so far only
as it is the vehicle of thought.*



Francis Bowen

American, born in Charlestown, Massachusetts, 1811

**A Treatise on Logic*

Critical Essays on the History and Present Condition of Speculative Philosophy

Documents of the Constitution of England and America

Principles of Political Economy, American Political Economy

Modern Philosophy, from Descartes to Schopenhauer and Hartmann

Gleanings from a Literary Life

A Layman's Study of the English Bible

Harvard professor of philosophy

Turned more to literary concerns as editor and proprietor of the *North American Review*

Denied History professorship due to his critique of the Hungarian revolution of 1848!!!

Focused on social changes resulting from economic conditions

Propounded agreement between philosophy and Christianity

His life and writings infused with piety

Member of the 1876 Currency Reform Commission

Honored by Harvard's annual Bowen Prize for best student essay in Moral or Political Philosophy

[Bowen Treatise on Logic](#)

[Bowen in American Philosophy](#)

In everyday life, we have constant occasion for seeing
(and we have no difficulty in seeing) the exact equivalence
of two such statements as these :

“ All students of chemistry are also students of either biology or physics.”

“ Students of chemistry who do not study physics all study biology.”

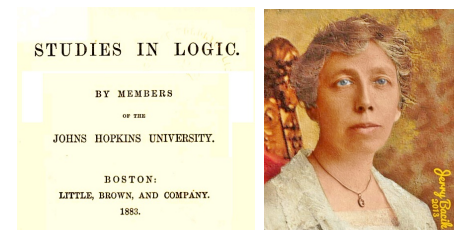
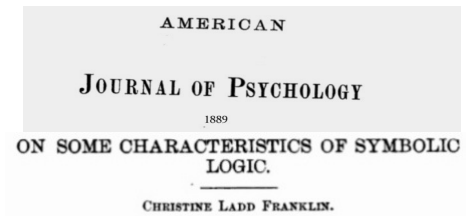
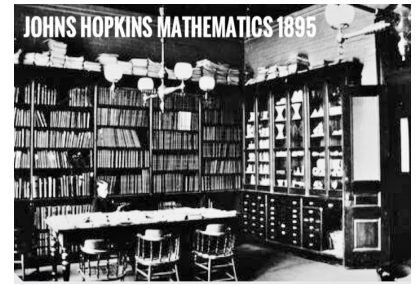
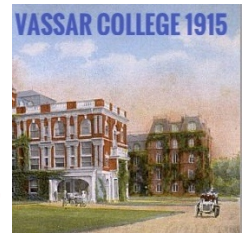
And yet this is an inference

which ordinary **logic** takes absolutely no account of.

What it amounts to is the changing of a positive disjunctive term
in the predicate into a negative conjunctive term in the subject.

It is a very simple step for the human mind to take,
and yet it is the starting point of the immense command
over intricate reasoning which is furnished
by the modern developments of Deductive **logic**.

The secret of the great command which Symbolic **logic** has
is wholly contained in the fruitful idea
that subject and predicate are not necessarily indivisible wholes,
but that they can be broken up
and their separate elements shifted at pleasure
from one side of the copula to the other.*



Christine Ladd Franklin

American, born Windsor, Connecticut, 1847

* “On Some Characteristics of Symbolic Logic”

“On The Algebra of Logic”, “Epistemology for the Logician”

“The Reduction to Absurdity of the Ordinary Treatment of the Syllogism”

Colour and Colour Theories – a major work in the ophthalmics and optics of color in vision

Forced to teach high school math for 9 years: **“I hate it with a perfect hatred—I shall not be able to endure it.”**

Vassar College, class of 1868; then “graciously” allowed to audit classes at Johns Hopkins University

Completed a dissertation under [Peirce](#) that was even published in a scholarly journal

But awarded a Ph.D. degree only 44 years later at age seventy-eight!!

Reduced Syllogistic inference to a single formula and a three stage anti-algorithm

Achievements all the more remarkable given the then anti-woman prejudice, especially in academe

Presented a trenchant expression of the Pre-Frege to post-Frege transformation in logic

Committed feminist and advocate for women in graduate school and in academic faculties ([see this letter](#))

Allowed to teach one course per semester at Johns Hopkins and Columbia with stipend but no rank

Occasionally spoke at several universities, often without pay

Never held an academic position from which to research, publish, and lecture

Associate editor of the landmark Baldwin *Dictionary of Philosophy and Psychology* (1901-5)

Over 100 articles on logic and on color vision

<http://www2.webster.edu/~woolfm/christine.html>

<http://vcencyclopedia.vassar.edu/alumni/christine--franklin.html>

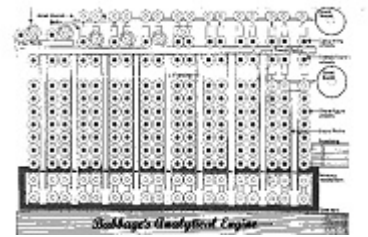
<http://www.jstor.org/stable/2178062?seq=1&#mobileBookmark>

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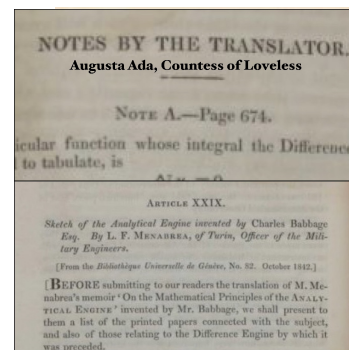
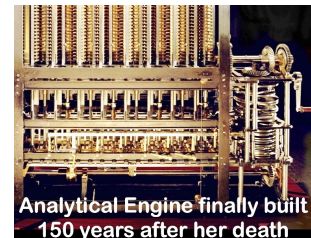
Logic has its own peculiar truth and value,
independently of the subjects
to which we may apply
its reasonings and processes.*

The Analytical Engine uses algebraic signs
according to their proper laws
and develops the **logical** consequences.*

The Analytical Engine
weaves algebraical patterns
just as the Jacquard-loom
weaves flowers and leaves.*



Lovelace Estate, Loch Torridon, Scotland



Augusta Ada Byron King

British, born London, 1815

*Notes in translation: Manebrea's "Sketch of the Analytical Engine Invented by Charles Babbage Esq."

Mathematician and first computer programmer

Countess of Lovelace by marriage at age 19 to William King-Noel

Collaborated with Charles Babbage who designed the first computer

Foresaw a machine to compose music, construct graphics, and conduct science

A remarkably original figure in the history of technology

Student of [Augustus De Morgan](#)

Yearned for and achieved fame in a "man's world"

Beset by drug addiction, chronic illness, infidelity, and gambling

Bore three children, but struggled with marriage and motherhood

Found in a letter to her from Babbage: ----->

**"Forget this world and all its troubles and if possible
its multitudinous Charlatans--**

everything in short but the Enchantress of Numbers."

Died at age 36, just as did her father, the poet Lord Byron

Computer language ADA named for her



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On the field of **logic**, people of the most opposite schools may meet and shake hands....

Men have started from some premise, and finding it in apparent opposition to certain recognised conclusions, have abandoned the latter in a moment, when the slightest consideration would have convinced them that the rejected propositions had better claims than that which was employed to subvert them. To do this is much as if one were to lean against a mud bank, in trying to throw down a stone wall.

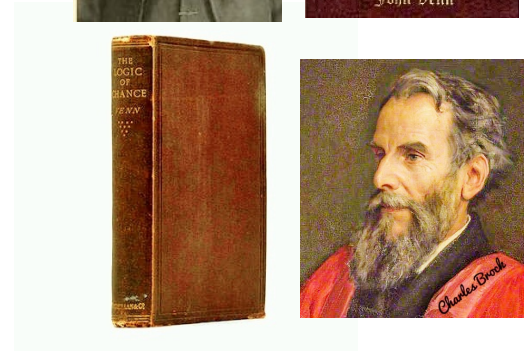
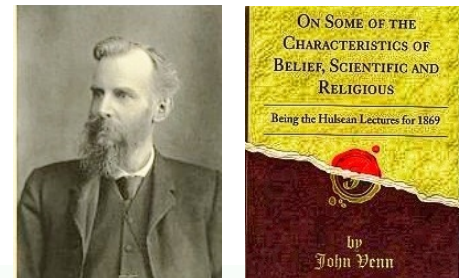
Is not the advice to disregard consequences rather like a relic of the sentiments engendered by the old scholastic disputes? Those who took part in them had to start from certain premises, which if they were not accepted irrevocably would cause the dispute to break down.

If discussion is a merely artificial matter to be conducted in accordance with rules, all you can do when you trip upon a hostile fact is to yield yourself prisoner, but if it is a means of honestly endeavouring to elicit the truth, the best thing to be done is to get up again with your improved knowledge and try again.*

Logic is not concerned with what we do believe, but what we ought to believe, if we are to believe correctly.**



William Matthison John Le Keux
Gonville and Caius College, Cambridge



John Venn

British, born Hull, Yorkshire, 1834

**On Some of the Characteristics of Belief Scientific and Religious*

***The Logic of Chance; Symbolic Logic; The Principles of Empirical Logic*

Best remembered for Venn diagrams still used in logic and mathematics

Mathematician, ordained Anglican deacon, logician, lecturer in moral sciences

For 70 years, undergraduate and then Fellow of Gonville and Caius College, Cambridge

With his son compiled a 500 year *Biographical Notes* of over 100,000 Cambridge University alumni

In his honor and memory, a fitting stained glass window in the college chapel **FIND STAINED GLASS**

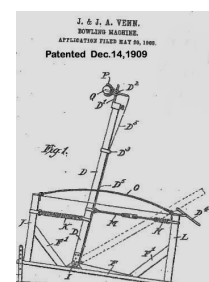
Resigned the priesthood saying “**it is incompatible with philosophy**”

A skilled mountain climber and keen botanist

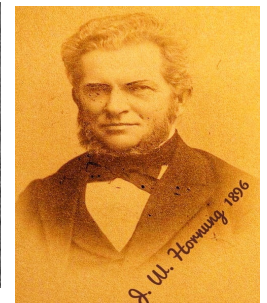
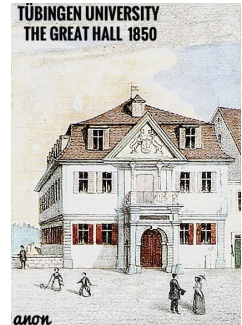
Built a cricket machine capable of clean bowling top batsmen----->

(cf. [Bernard Bosanquet's](#) nephew)

<http://www.informationphilosopher.com/solutions/philosophers/venn/>



If we consider the nature of our Thought,
we find that an important part of it
is engaged in the attempt to arrive at propositions
which are certain and universally valid,
but that it frequently fails to do this
when left to its natural development.
Hence arises the problem of ascertaining
the conditions under which this object
can be attained, and of determining
in accordance with those conditions
the rules to be followed in its attainment.
The solution of this problem would place us
in possession of a technical science of thought,
directing us how to arrive
at certain and universally valid propositions.
Such a science we call **logic**.*



Christoph von Sigwart

German, born Tübingen, Württemberg, 1830

**Logic* (English translation by Helen Dendy, wife of [Bernard Bosanquet](#))

Philosopher, logician, and theologian

Held (mistakenly, as many then did) that logic is both given and grounded in psychology

Still, in its time, a comprehensive handling of all aspects of logic

Logic textbook highly regarded and widely used in Great Britain and the United States

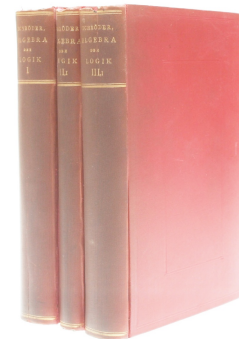
Student and later Professor at Tübingen University

http://books.google.com/books?id=ThIVAAAAMAAJ&printsec=frontcover&dq=inauthor:sigwart&hl=en&ei=3PqWTYv3EJT2gAfqqbjQCA&sa=X&oi=book_result&ct=result&resnum=1&ved=0CC8Q6AEwAA#v=onepage&q&f=false

Getting a handle
on the consequences of any premises
seems to me to be the noblest,
if not the ultimate goal of **logic**.*



Karlsruhe c. 1885



Ernst Schröder

German, born Mannheim, Baden, 1841

**The Algebra of Logic* (two thousand pages in three volumes)

Amazing accomplishments in logic, technology, and mathematics

With [Charles S. Peirce](#) reinterpreted the thesis that logic is the basis of mathematics

An avid sportsman: cycling, hiking, swimming, ice-skating, horseback riding

Worked mainly in gymnasiums and technical schools

Thus largely unrecognized within the university establishment

Pedaling around town and campus, became known as the “Bicycle-Professor”

Took up skiing at age 60 only to catch cold and die of brain-fever

http://projecteuclid.org/DPubS/Repository/1.0/Disseminate?view=body&id=pdf_1&handle=euclid.rml/1204834612

click Open Access PDF file

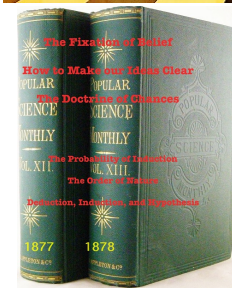
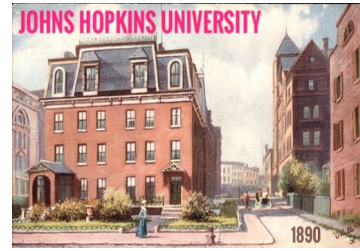
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I define **logic** as the science of determining the conditions which enable symbols in general to refer to objects.*

Logic has been essentially the science of the structure of arguments, whereby we can distinguish good arguments from bad ones, can estimate the value of an argument, can determine upon what conditions it is valid, how it needs to be modified, and what can be inferred from a given state of facts.**

The difficulty of showing how the law of deductive reasoning is true depends upon our inability to conceive of its not being true.***

The truth is, that common-sense, or thought as it first emerges above the level of the narrowly practical, is deeply imbued with that bad logical quality to which the epithet metaphysical is commonly applied; and nothing can clear it up but a severe course of **logic**.****



Charles Sanders Peirce

American, born Cambridge, Massachusetts, 1839

* “What Is Logic?” Harvard Logic Lecture #1

** “A Practical Treatise on Logic and Methodology”

“Questions Concerning Certain Faculties Claimed For Man”

*** “Some Consequences of Four Incapacities”

**** “The Fixation of Belief” (among articles in *Popular Science Monthly* magazine.....above)

Perhaps the greatest intellect born in the United States of America

Harvard B.A. and M.A. in chemistry, not philosophy nor mathematics

Thirty-two years researcher at Coast and Geodetic Survey

Philosopher, logician, mathematician, scientist (in ten areas), inventor, psychologist, historian, economist, critic, playwright, stage performer, fiction author

Founded Pragmatism, developed it extensively and persuasively

Argued that meaning, in any form, is defined in term of practical consequences

Led and prominent in the Metaphysical Club (see link below)

Lectured for five years at Johns Hopkins University (above)—his only academic position

Dissertation director for [Christine Ladd](#)

Petty scandals and clashes excluded him from academe

Supported anonymously by [William James](#) and [Victoria Lady Welby](#)

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When, after observing that gold, silver, lead, and other metals, are capable of being reduced to a liquid state by the application of heat, the mind leaps to the conclusion that the same will hold true of some other metal, as platinum, or of all metals, we have then an inductive inference, in which the conclusion, or consequent, is a new proposition, which was not contained in those that went before. We are led to this conclusion, not by reason, but by an instinct which teaches us to expect like results, under like circumstances.

Experience can tell us only of the past; but we allow it to affect our notions of the future through a blind belief that the thing that hath been, it is that which shall be; and that which is done is that which shall be done; and there is no new thing under the sun.

Take away this conviction, and the bridge is cut which connects the known with the unknown, the past with the future.

The commonest acts of daily life would fail to be performed were it not for this assumption, which is itself no product of the reason. Thus man's intellect, like his faculties generally, rests upon a basis of instinct.

He walks by faith, not by sight.

It is a mistake to talk of inductive reasoning as though it were a distinct species from deductive.

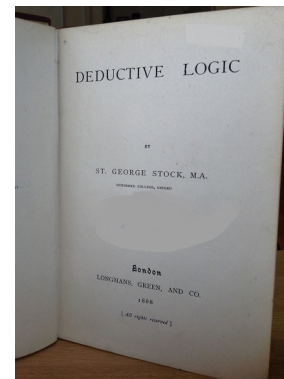
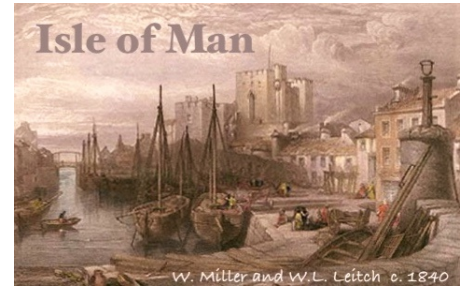
The fact is that inductive inferences are either wholly instinctive, and so unsusceptible of **logical** vindication, or else they may be exhibited under the form of deductive inferences. We cannot be justified in inferring that platinum will be melted by heat, except where we have equal reason for asserting the same thing of copper or any other metal.

In fact we are justified in drawing an individual inference only when we can lay down the universal proposition "Every metal can be melted by heat".

But the moment this universal proposition is stated, the truth of the proposition in the individual instance flows from it by way of deductive inference.

Take away the universal, and we have no **logical** warrant for arguing from one individual case to another.

We do so, as was said before, only in virtue of that vague instinct which leads us to anticipate like results from like appearances.*



St. George Stock

British, born Douglas, Isle of Man, 1850

"St. George" a given name to evoke protection by the Patron Saint of England

**Deductive Logic*

Attempts At Truth, Lectures in the Lyceum or Aristotle's Ethics for English Readers

Selections From The Septuagint: According To The Text Of Swete

Resident scholar (Philosophy and Classics), Pembroke College, Oxford; Lecturer in Greek, University of Birmingham

Several articles for the 1911 *Encyclopedia Britannica*

Viewed Stoicism simply as the ethics of Socrates+Plato+Aristotle+Heraclitus

Focused on the Hebraic, Semitic, and classical Greek basis of the New Testament

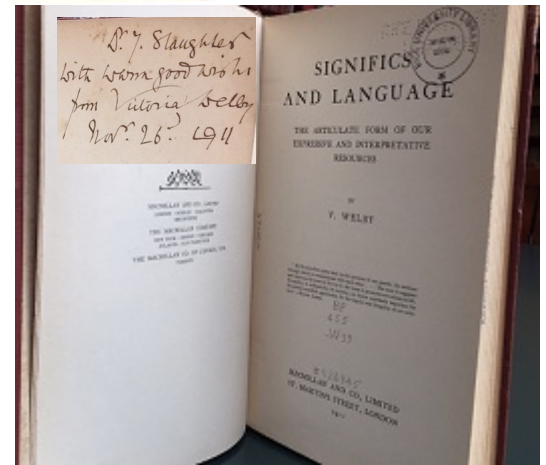
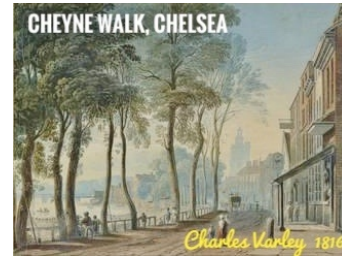
Sought harmony of the outer world that is and inner search for what can be

Author (with Algernon Swinburne) of the outrageous *Whippingham Papers*

<https://archive.org/details/deductivelogic00stocuoft>

The child is incapable of **logic**
in a consciously analytical sense;
but once started,
his “thoughts” arrange themselves
in normal sequence.*

There are many obstacles
to block the path
of mental advance....
To rightly correct these
add some training
in at least elementary **logic**.**



Victoria Lady Welby

British, born Chelsea, London, 1837

**Significs and Language*

***What Is Meaning? Studies in the Development of Significance*

Time as Derivative, Sense, Meaning, and Interpretation

Virtually self-educated

Pioneering and still well-regarded work in semiotics

Significant correspondence with notable scholars such as [Charles Sanders Peirce](#)

Published in leading journals

Accomplished musician, painter, poet, and playwright

Founded the Royal School of Needlework and Sociological Society of Great Britain

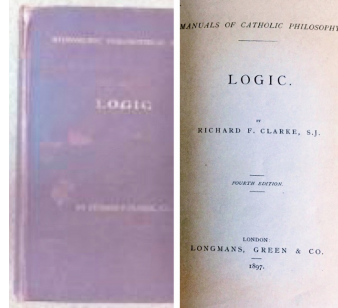
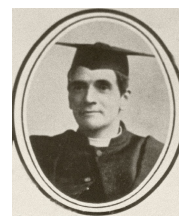
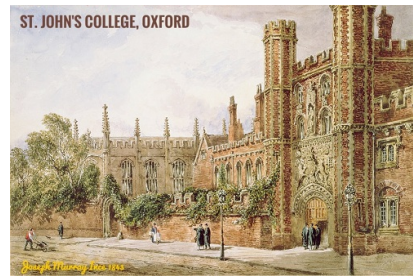
Maid of Honor to her godmother— Queen Victoria

http://books.google.com/books?id=BowQAAAAIAAJ&pg=PP1&dq=inauthor:victoria+inauthor:&hl=en&ei=QPLTsfQI8bYgQe1_viqDQ&sa=X&oi=book_result&ct=book-thumbnail&resnum=2&ved=0CDgQ6wEwATgK#v=onepage&q=inauthor%3Avictoria%20inauthor%3A&f=false

http://books.google.com/books?id=uCYpAQAIAAJ&printsec=frontcover&dq=intitle:significs+intitle:and+intitle:language+inauthor:victoria+inauthor:&hl=en&ei=zKXpTrzAEIqutwfY3tyRCg&sa=X&oi=book_result&ct=result&resnum=1&ved=0CDcQ6AEwAA#v=onepage&q&f=false

<https://www.erudit.org/revue/ttr/2007/v20/n1/018498ar.html>

But what is the meaning of formal **logic**?
It is that part of **logic**
which deals with the forms according to which
all correct thought proceeds with the laws
which regulate thought,
the universal and irrefragable rules
which must govern every act of thinking,
if it is to be correct.
It is the business of formal **logic** to enforce their
observance on every thinker
and to allow no sort of deviation,
even by a single hair's-breadth from their enactments.
It has to proclaim these laws
eternal and immutable as God Himself,
and to pronounce its anathema on all who declare
that they admit of any exception
under any circumstances whatever.
From the beginning to the end of time,
nay before Time was and after Time shall be no more,
in any conceivable world
which God has created or could create,
these laws are unchangeable and inviolable,
and God Himself cannot interfere with them
in their very smallest detail.
For they are the foundation of all Truth
and are themselves founded
upon the nature of the God of Truth.
God could not violate them without ceasing to be God,
and man cannot violate them
without violating that rational nature
which he possesses in virtue of
his creation in the likeness of God.*



British, born Islington, Middlesex, 1845

**Logic* (well received school handbook)

The Existence of God: A Dialogue in Three Chapters; The Adorable Heart of Jesus

University Education in Ireland: A Retrospect and a Prospect

Expounded a vigorous analysis and defense of the Principles of Contradiction and Identity

Graduate, Fellow of, and highly sought after tutor, St John's College, Oxford University

Anglican priest, converted to Catholicism, ordained Jesuit priest at age 39

Recognized leadership in the pioneering Farm Street Church, Mayfair

Strove to make Catholic teachings understandable by the average minimally schooled faithful

Editor of *The Month*, the magazine for Catholic news, culture, and events

Led the [Stonyhurst Philosophy Publication](http://www.archive.org/details/cu31924031245545) series

Authored dozens of Catholic Truth Society manuals, a million copies sold world wide

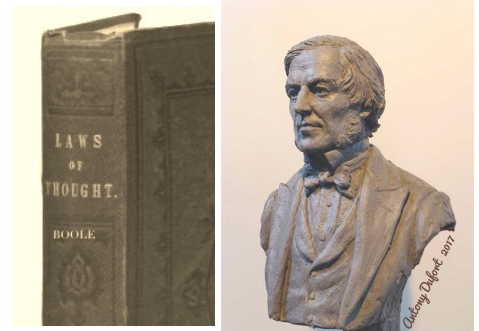
Advocated and supported education for women, so long denied them

Founding Principal of Clarke's Hall, Oxford; later renamed Campion Hall

Richard Frederick Clarke S.J.

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To enable us to deduce correct inferences
from given premises
is not the only object of **logic**.
It also has an interest of another kind,
derived from the light which it sheds
upon the essential standards
of truth and correctness —
standards not derived from without
but deeply founded
in the constitution of the human faculties.
To unfold the secret laws and relations
of those high faculties of thought by which all
beyond the merely perceptive knowledge
of the world and of ourselves
is attained or matured
is an object which does not stand in need
of commendation to a rational mind.*§



George Boole

British, born Lincoln, Lincolnshire, 1815

**An Investigation of the Laws of Thought*

Mathematical Analysis of Logic

Had minimal formal education, so studied and worked privately

Opened his own school in Lincoln

At age 34, appointed lecturer, Queen's College, Cork, Ireland

Enlarged logic to embrace probability, as well as necessity

Developed "Boolean Algebra" based on a yes/no, on/off, one/zero logical model

Achievements are still the basis of the architecture in **all** digital science and technology

Died at age 49 of pneumonia after walking to class in the rain and lecturing soaking wet

Contemporary Augustus De Morgan wrote, prophetically:

"Boole's system of logic...excited admiration from its first appearance. That the symbolic processes of algebra, invented as tools of numerical calculation, should be competent to express every act of thought, and to furnish the grammar and dictionary of an all-containing system of logic, would not have been believed until it was proved....The unity of the forms of thought in all the applications of reason, however remotely separated, will one day be matter of notoriety and common wonder; and Boole's name will be remembered in connection with one of the most important steps towards the attainment of this knowledge."

§ quotation somewhat but harmlessly condensed

<http://archive.org/stream/aninvestigationo15114gut/15114-pdf#page/n1/mode/2up>

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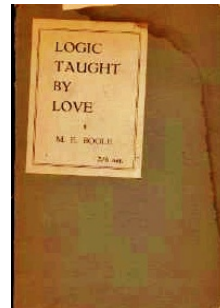
Logic proper begins at the point where we introduce into our reasoning considerations derived from an order of thought higher than that whose relations we are investigating.*

Do not deceive yourself, because deceiving yourself distorts your brain and ruins the possibility of using **logical** methods skillfully to arrive at the knowledge of truths.**

For learning the art of the orderly arrangement of thought, no previous knowledge is necessary of **logic** or of any science whatsoever. What is necessary is a willingness not to resist.***



MARY AND GEORGE



Mary Everest Boole

British, born Wickwar, Gloucestershire, 1832

**Logic Taught By Love*

***Philosophy and Fun Of Algebra*

****The Forging Of Passion Into Power, The Preparation Of The Child For Science*

Symbolical Methods Of Study, Lectures on Logic and Arithmetic

Highly accomplished and mainly self-taught mathematician

Married [George Boole](#), who died at 49, leaving her with five young daughters

Moved to London and was librarian at the new Queen's College for women (above)

Praised for teaching excellence by the London Board of Education

Collaborated with [Victoria Lady Welby](#) on the semiotics of the learning process

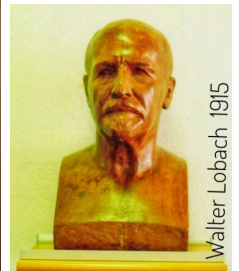
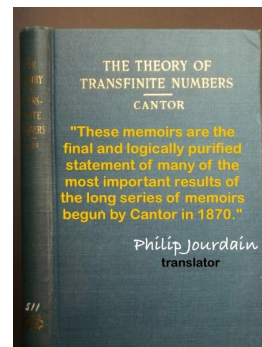
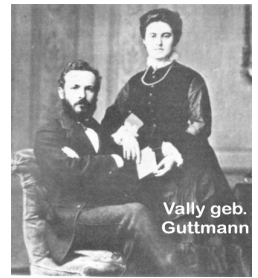
Was convinced that logic and mathematics reveal deeper spiritual and philosophical truths

Mount Everest named for her uncle George, Surveyor General of India

<http://books.google.com/books?id=1akAAAAAYAAJ&printsec=frontcover#v=onepage&q&f=false>

<http://www.youtube.com/watch?v=hMumdRMzNA>

We are not sure
of the **logical** soundness
of our methods and results
until we make everything about them
quite definite.*



Georg Cantor

German; born Saint Petersburg, Russia, 1845

**Foundations of a General Theory of Aggregates*

Contributions to the Founding of the Theory of Transfinite Numbers

Professor at University of Halle, Wittenberg

Regarded as one of the greatest of all mathematicians

Almost singlehandedly created set theory and transfinite mathematics

Argued that for every infinite set, there is a larger one, thus infinitely many infinite sets!

Believed the theory of transfinite numbers had been communicated to him by God

Published attempts to show that [Francis Bacon](#) wrote all of Shakespeare

Argued that transfinite numbers and multiple infinities disprove fatalism and materialism

Beset by academic, theological, and social criticism, appealed to Pope Leo XIII:

**“Transfinite numbers are of the intentions of the Creator
and His absolute boundless will.”**

Early, a talented and promising violinist

Lunar crater named for him

<http://www.math.vanderbilt.edu/~schectex/courses/infinity.pdf>

<http://nautil.us/issue/2/uncertainty/the-deepest-uncertainty>

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Symbolic **logic** is usually thought to be
a hard and abstruse subject.

But my symbolic system is, on the contrary, so simple
that an ordinary schoolboy of ten or twelve
can in a very short time master its fundamental conceptions
and learn to apply its rules and formulae to practical problems.

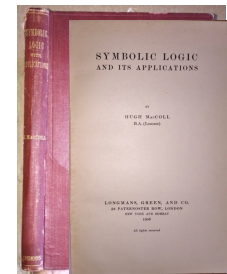
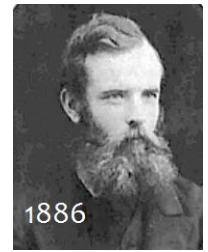
Propositions are the real units of all reasoning,
provided they convey the meanings intended.

The words chosen and their arrangement matter little.

Every intelligible argument, however complex,
is built up of individual propositions;
and whenever a simple elementary symbol,
such as a letter of the alphabet,

is sufficient to indicate or represent any proposition, it will be
a great saving of time, space, and brain labour thus to represent it.*

Other logicians generally divide **logic** into two parts:
the **logic** of *class inclusion* and the **logic** of *propositions*.
Mine is *one simple homogeneous system* which comprises
all the valid formulae of their systems,
as well as many other formulae
which their systems cannot even express.**



Hugh MacColl

British, born Strontian, Argyllshire, Scotland 1837

**Symbolic Logic and its Applications*

***Mind* #12 new series (one of several papers in *Mind*)

More seminal papers in other notable journals

Man's Origin, Destiny and Duty (argues that logic by its very existence, reveals divinity)

Mr. Stranger's Sealed Packet (an early science fiction classic about a journey to the planet Mars)

Knew only Gaelic until teenage

Urged to take Anglican Orders (in return for tuition at Oxford) by [William Gladstone](#), but declined

At age 28 moved to Boulogne-Sur-Mer, France, permanently.

Soon thereafter earning his B.A. via the University of London's new Extension Degree program

Formalized propositional logic several years before Frege's *Begriffsschritte*

Lively exchanges with [Peirce](#), [Boole](#), [Jevons](#), [Schröder](#), [Russell](#), [Couturat](#), and [Peano](#)

Decades later, credited for original work in modal logic by [C. I. Lewis](#)

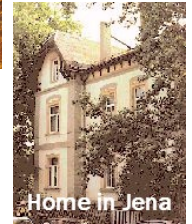
**“Nothing is stranger in the recent history of Logic in England,
than the non-recognition which has befallen the writings of this author.”..... [Christine Ladd Franklin](#)**

<https://archive.org/details/mindreview05edinuoft>

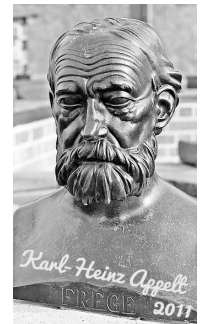
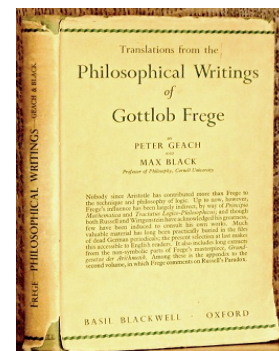
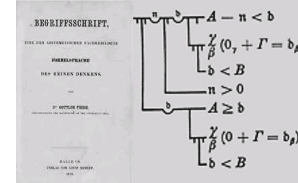
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What really pertains to **logic**
lies not in truth,
but in the asserting force
by which truth is spoken.*

The laws of **logic**
are the most general laws,
which prescribe universally the way
in which one ought to think
if one is to think at all.**



Revolutionary "Concept Script"



Gottlob Frege

German, born Wismar, Mecklenburg-Schwerin, 1848

**The Idea; Concept Script*

***Foundations of Arithmetic; On Sense and Reference, Basic Laws of Arithmetic*

Scholar of profound insight who revolutionized and transformed logic

Full Honorary Professor at the University of Jena

Developed predicate functions and quantification, now basic in logic

Launched the important distinction between meaning versus reference

Thus initiating the ever since focus on the Philosophy of Language

Though modest and reserved, was yet politically conservative, even xenophobic

Revered the German monarchy, a life-long hiking enthusiast

Attributed defeat in the Great War to dreaded socialism and democracy

Vainly proud of his genius and unforgiving of non-recognition

Was certain (correctly!) of his ultimate fame

Unpublished papers lost in the carnage of war, 20 years after his death

Admittedly standoffish to both students and colleagues

TOC

Logic is the science of valid argumentation.

When I say, "This table is black," I am speaking of the table;
I have seen it black, and my judgment expresses what I have seen.

But if I say, "This table is not white,"

I surely do not express something I have perceived,
for I have seen black, and not an absence of white.

It is therefore, at bottom, not on the table itself that I bring this judgment to bear,
but rather on the judgment that would declare the table white.

I judge a judgment and not the table.....

How comes it, then that affirmation and negation
are so persistently put on the same level and endowed with an equal objectivity?

How comes it that we have so much difficulty
in recognizing that negation is subjective,
artificially cut short, relative to the human mind and still more to the social life?

The reason is, no doubt, that both negation and affirmation
are expressed in propositions,

and that any proposition, being formed of words,
which symbolize concepts is something relative
to social life and to the human intellect.

Whether I say "The ground is damp" or "The ground is not damp,"

in both cases the terms 'ground' and 'damp' are concepts
more or less artificially created by the mind of man—

extracted, by his free initiative, from the continuity of experience.

In both cases the concepts are represented by the same conventional words.

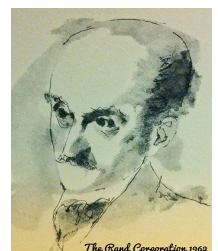
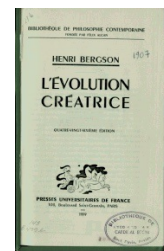
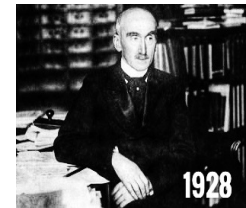
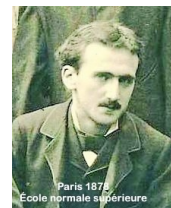
In both cases we can say indeed that the proposition aims
at a social and pedagogical end, since the first would propagate a truth
as the second would prevent an error.

From this point of view, which is that of formal **logic**,
to affirm and to deny are indeed two mutually symmetrical acts,
of which the first establishes a relation of agreement
and the second a relation of disagreement between a subject and an attribute.

But how do we fail to see that the symmetry
is altogether external and the likeness superficial? *§

§

L. E. J. Brouwer espouses a revised formal logic somewhat based with these ideas



Henri Bergson

French, born Paris, 1859

**Creative Evolution* (1927 Nobel Prize; magnificent and groundbreaking opus for Process Philosophy)

Time and Free Will; Matter and Memory; The Two Sources of Morality and Religion; Laughter

Marcel Proust — best man at Bergson's wedding.

Collège de France--Chair of Greek and Latin Philosophy

Challenged all philosophy, including Logic, arguing that Continuity and Intuition are the bases of all experience

Lectured frequently in England, Scotland, and America

Praised by pragmatism's Charles Sanders Peirce and, exceedingly, William James

Great War emissary to President Wilson, was convinced that only with America could France be saved

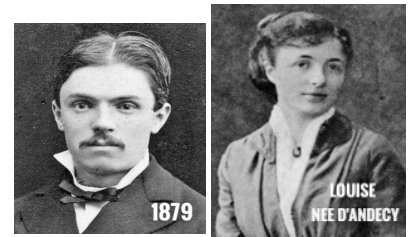
<http://www.informationphilosopher.com/solutions/philosophers/bergson/>

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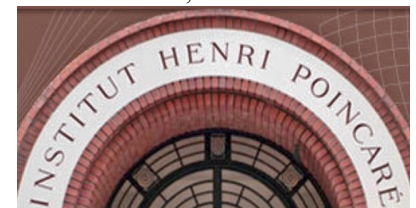
It is by **logic** that we prove,
but it is by intuition that we discover.

....

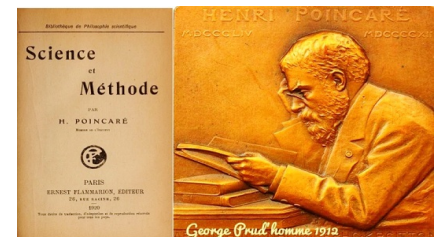
Logic teaches us
that on such and such a road
we are sure of not meeting an obstacle;
it does not tell us which is the road
that leads to the desired end.
For this it is necessary
to see the end from afar,
and the faculty which teaches us to see
is intuition.*



Famous Quantum conference
Brussels, 1911



Paris, 11 rue Pierre et Marie Curie



Henri Poincaré

French, born Nancy, 1854

**Science and Method*

*On the Foundations of Geometry, Intuition and Logic in Mathematics
Mathematics and Logic, Science and Hypothesis, The Value of Science*

Multifaceted mathematician and scientist

Had absolute photographic memory his entire life

Was a mine inspector from age 22 until his death

University of Paris primary lecturer in mathematics and science from age 27

Could work out complete solutions without paper

Seminal works in topology, algebra, celestial mechanics, relativity, and Chaos Theory

Stressed that mathematics is not simply an extension of logic

Cousin Raymond, President of France during the Great War

Contributed much toward acquittal in the Dreyfus affair

Lunar crater named for him

<https://www.usna.edu/Users/math/meh/poincare.html>

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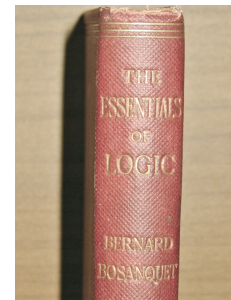
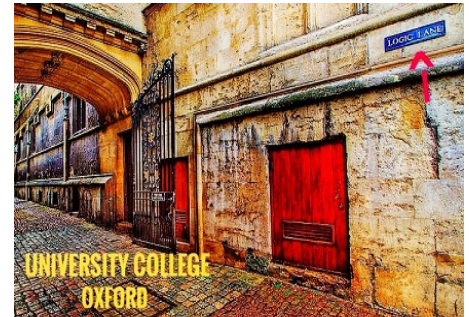
The work of intellectually constituting that totality which we call the real world is the work of knowledge.

The work of analyzing the process of this constitution or determination is the work of **logic**, which might be described as the self-consciousness of knowledge, or the reflection of knowledge upon itself.

...

The relation of **logic** to truth consists in examining the characteristics by which the various phases of the one intellectual function are fitted for their place in the intellectual totality which constitutes knowledge.*

Helen nee Dendy
Renowned Social Reformer
Scholar and Poet



Bernard Bosanquet

British, born Alnwick, Northumberland, 1848

**Logic, or the Morphology of Knowledge; The Essentials of Logic*

A History of Aesthetic, The Philosophical Theory of the State

The Principle of Individuality and Value, The Value and Destiny of the Individual

Zoar, A book of Verse (With wife Helen)

Prominent figure in the Philosophical Idealism movement of the time

Fellow of University College, Oxford; Chair of Philosophy, University of St. Andrews

Active in the Charity Organization Society—addressing need while demanding responsibility

Opposed state funded Old Age Pension, arguing that it subverts individual initiative

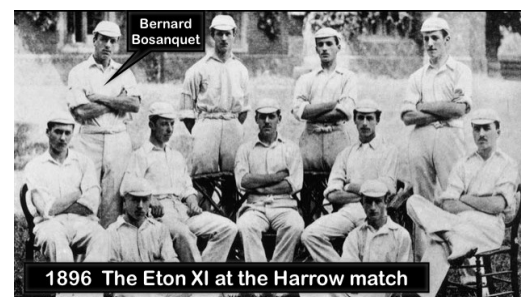
Helped organize Britain's first adult education classes

Keen botanist

Namesake nephew invented/perfected the [GOOGLY](#) ---->

(cf. [John Venn's](#) patented invention)

[The Essentials of Logic](#)





Logic has in view an ideal and treats of what ought to be.

....

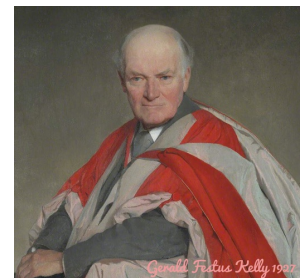
Logic has thus a unique character of its own
and is not a mere branch of psychology.

Psychology is concerned with the origin of our beliefs,
logic with their validity.

....

Wherein then consists the utility of **logic**?
Its study is of value simply that by its aid we advance
in the knowledge of ourselves and of our capacities.

The study of **logic** cultivates
the power of abstract thought
and affords a unique mental training.*



John Neville Keynes

British, born Salisbury, 1852

**Studies and Exercises in Formal Logic*

The Scope and Method of Political Economy

Fellow (logic and economics) of Pembroke College, Cambridge

Leader in revision of university level educational program

Championed the first women's college—Girton, Canbridge ([Constance Jones](#))

Stressed that logic is not an empirical science

Strove to synthesize deductive and inductive approaches to economics

Focused on what economy should be, not simply what it is

Wife Florence, a noted social reformer, elected Mayor of Cambridge in 1932

Both he and she lived to age 97

Son John Maynard also an economist of note

Both father and son tournament level chess

<http://www.archive.org/details/studiesandexerci029427mbp>

http://www.ampltd.co.uk/digital_guides/economists_papers_series_two_john_neville_keynes/editorial-introduction.aspx

The algebra of **logic** itself
arises out of pure **logic** considered
as a particular mathematical theory,
for it rests on principles
which have been implicitly postulated
and which are not susceptible
of algebraic nor symbolic expression because
they are the foundation of all symbolism
and of all the **logical** calculus.*



Louis Couturat

French, born Ris-Orangis, Essonne, 1868

**The Algebra of Logic* (the classic introduction) §

The Logic Of Leibniz (enshrining Leibniz as the then greatest logician since Aristotle)

History of the Universal Language, Foundations of Arithmetic

The Principles of Mathematics

Foresaw a future when Aristotelean logic would expanded in line with modern science

Rejected any argument that reduces logic to psychology

Having private means, preferred independent study and research

Brief professorships at universities in Caen, Toulouse, and Paris

Created, published, and worked hard for the universal language Ido

A confirmed pacifist, was killed on the first day of the Great War when his car was struck
by another carrying orders for the mobilization of the French Army

§ The “Preface” by Philip Jourdain contains this half-hearted appraisal of Couturat’s opus:

“Logic has now so *thriven* upon symbols, so grown and altered that many old-fashioned logicians do not recognize it. Alas, this metaphor is not quite correct: logic has neither grown nor altered, but we now see more *of* it and more *into* it.....The new Symbolic logic is, in essentials, the logic of Aristotle, given new life and power being dressed up in the wonderful almost magical armour and accouterments of Algebra.”

Logic, logic! Logic makes us derive conclusions from established principles, from data, from premises, but it does not give us new data nor new first principles.

To ask for **logic** is to ask that we not go beyond the principles furnished by reason.

And why should I be a slave to these?*

All the labored arguments in support of our hunger for immortality, which pretend to be grounded on reason or **logic**, are merely advocacy and sophistry.

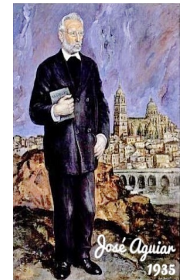
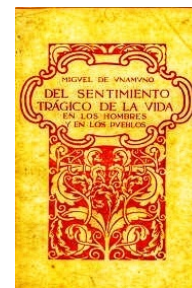
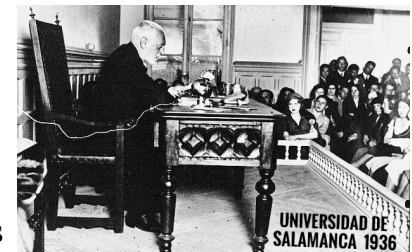
The property and characteristic of advocacy is, in effect, to make use of **logic** in the interests of a thesis that is to be defended, while, on the other hand, the strictly scientific method proceeds from the facts, the data, presented to us by reality, in order that it may arrive, or not arrive, as the case may be, at a certain conclusion.

What is important is to define the problem clearly, whence it follows that progress consists not seldom in undoing what has been done.

Advocacy always supposes a *petitio principii*, and its arguments are ad *probandum*.

And theology that pretends to be rational is nothing but advocacy.**

Suggest comparing these to [William Minto](#) and [Karl Popper](#)



Miguel de Unamuno

Spanish. born Bilbao, 1864

* *Diaries*; ** *The Tragic Sense of Life*

Mist and *Abel Sánchez* (novels); *Brother Juan* (drama)

From Fuerteventura to París and *Adventures and Visions of Spain* (poems)

Philosopher, novelist, poet, playwright, social/political critic and activist

Professor of Greek and Rector at the University of Salamanca

An existentialist Catholic and strongly opposed to church dogmatism à la Kierkegaard

Very concerned with death, suffering, substance, immortality, first principles, the lot

Ousted and banished to the Canary Islands for opposing dictator Miguel de Rivera

Fully reinstated after Rivera's fall

Then under house arrest after a highly publicized confrontation with Franco's Falangists

Died in two months on New Years Eve, an enshrined and renowned figure in Spain ever since

Ten children

<https://thesmartset.com/article12061301/>

<http://www.worldculture.org/articles/Unamuno%20Philosophy.pdf>

<https://m.youtube.com/watch?v=ZiDlcBPgFy8>

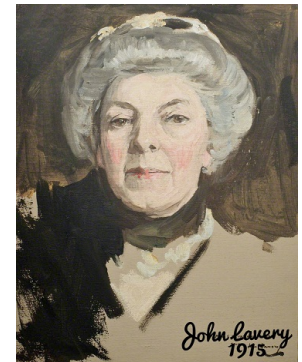
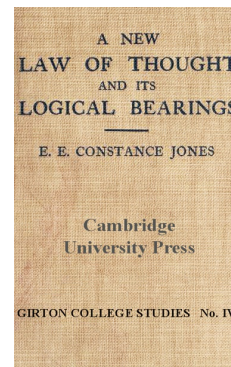
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Does not everyone want to know
the difference between good argument and bad?*

All knowledge is contained
in statements or propositions.
The only method of explaining, questioning, justifying,
or disproving any proposition
is by means of other propositions
having some relation to it.

Hence **logic** may be called the science
of the import and relations of propositions;
and since all Sciences are expressed in propositions,
logic is thus the Science of Sciences —
that is, the Science of a method of procedure
which applies in every department of knowledge. §

General **logic** starts from the standpoint
of ordinary thought and assumes reason in man
and trustworthiness in language.**



Constance Jones

British, born Llangarron, Herefordshire, 1848

**As I Remember: An Autobiographical Ramble*

***An Introduction to General Logic*

Elements of Logic as a Science of Propositions

A New Law of Thought and Its Logical Bearings

Student, then Lecturer, then Mistress at Girton, first women's college at Cambridge

Well recognized member of the logic elite prior to the Great War

Dec. 1, 1899: first woman to deliver a paper at the Cambridge Moral Sciences Club

Anticipated major themes in [Gottlob Frege](#), [Bertrand Russell](#), and other logicians

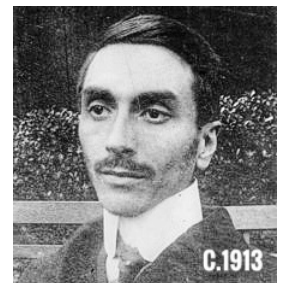
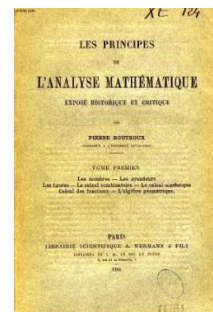
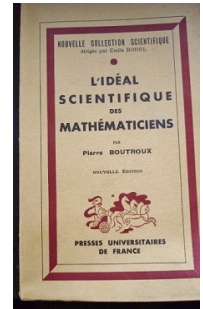
Highly moved by rural church architecture

§ Echoing the 13th century's [Peter of Spain](#)

<https://archive.org/details/asirememberautob00joneiala>

http://books.google.com/books?id=NQZVAAAAMAAJ&pg=PR1&dq=logic+inauthor:constance+inauthor:jones&hl=en&sa=X&ei=GalMT_GRC4-btweEzZwx&ved=0CEUQ6AEwAw#v=onepage&q=knowledge&f=false

READ TOMBSTONE INSCRIPTION



Pierre Leon Boutroux

French, born Paris, 1880

**The Principles of Mathematical Analysis*

Scientific Ideal of Mathematicians in Ancient and Modern Times (engrossing)

Highly respected mathematician and historian

Also a spiritual philosopher, insisting on freedom and spontaneity of the spirit

Argued that modern science requires indeterminacy

Professor at Poitiers, Princeton (before the Great War), and Collège de France

Served with distinction in the Great War

Nephew of Henri Poincaré

Productive work cut short by death aged 42

http://query.nytimes.com/mem/archive-free/pdf?_r=1&res=9800EFDF1F39E633A25757C2A9639C946596D6CF

<http://www.ams.org/journals/bull/1923-29-10/S0002-9904-1923-03800-7/S0002-9904-1923-03800-7.pdf>

Logic works by predicating of the single instance
what is true of all its kind.

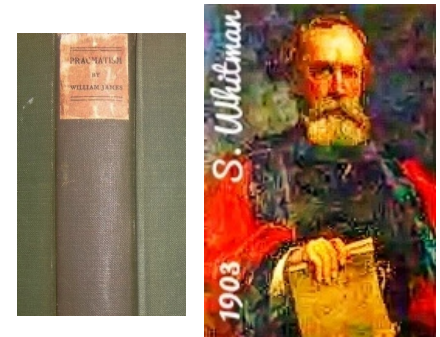
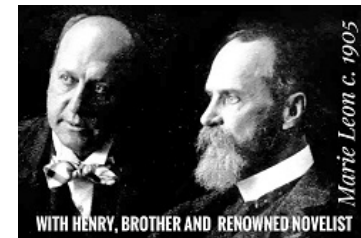
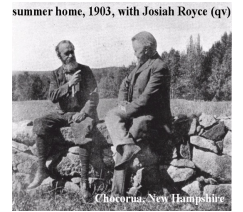
...

Experiences might have all been singulars,
no one of them occurring twice.

In such a world **logic** would have had no application;
for kind and sameness of kind
are **logic's** only instruments.*

Logic has been defined
as the 'substitution of "similarities",
and in general one may say
the perception of likeness and unlikeness
generates the whole of "necessary" truth.

Nothing *happens* in the world of **logic**.
That is what gives **logic** its "eternal" character.**



William James

American, born New York City, 1842

**Pragmatism: A New Name for Some Old Ways of Thinking*

***Some Problems of Philosophy*

The Principles of Psychology (soon authoritative and still highly regarded)

The Will to Believe, The Dilemma of Determinism

Essays in Radical Empiricism (superb)

Physician, psychologist, philosopher

When teaching logic at Harvard used Jevons' *Elementary Lessons in Logic*

Founder of Harvard's psychology department and first laboratory of experimental psychology

Then became a leading professor of philosophy

Within academe and in public, the most influential proponent of Pragmatism

Always gave due credit to Charles Sanders Peirce as the seminal developer of Pragmatism

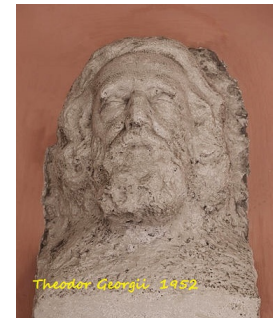
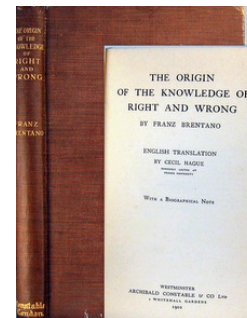
Traveled widely; much sought-after lecturer, but relished rural New Hampshire

Brother Henry, preeminent American/British novelist

In above photograph, blurted to Royce "**Look out! Damn the Absolute.**"

The laws of **logic**
are naturally valid rules of judging.
That is to say we are obliged
to conform to them
since conformity to these rules
ensures certainty in our judgments
whereas judgments diverging
from these rules are liable to error.

What we therefore mean
is a natural superiority
which thought processes
in conformity with law
have over such as are contrary to law.*



Franz Brentano

German/Austrian, born Marienberg am Rhein, 1838

**The Origin of our Knowledge of Right and Wrong*

The Psychology of Aristotle, Psychology from an Empirical Standpoint

Aristotle and his World View, The Classification of Mental Phenomena

Full Professor at the University of Vienna

Ordained priest but resigned fiercely denying Papal Infallibility

To marry, ceded Austrian citizenship/professorship

Totally transformed a doctrine of medieval scholasticism, calling it “intentionality”

Objects of thought being realities, but radically apart from realities in the external world

Among his students: [Edmund Husserl](#) and [Alexius Meinong](#)

Modified classical logic in line with his theory of non-objective predicates

Turmoil of the Great War finally led him to Switzerland

<https://mechanism.ucsd.edu/teaching/w07/philpsych/brentanoandjames.pdf>

<http://www.marxists.org/reference/subject/philosophy/works/ge/brentano.htm>

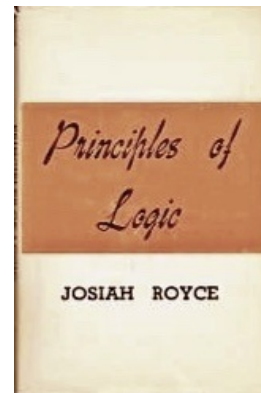
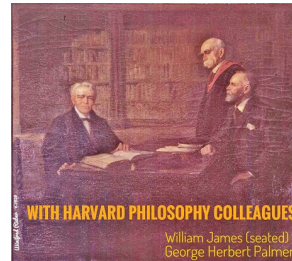
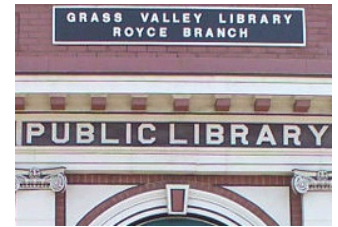
TOC

A FORM OF THOUGHT is
a way in which we must think
whenever we think at all.

As men all have much
the same sort of eyes or of hands,
whatever the race or business of the men,
so all have much the same sort of minds.

All men walk on two legs
and even so all men think
in a series of assertions
that are joined in some way
more or less close.

This that is common to all human thought,
this way in which we all do our thinking,
is called by a metaphor a form of thought,
logic being the science
that tells us about these forms.*



Josiah Royce

American, born Grass Valley, California, 1855

**Primer of Logical Analysis*

California: A Study of American Character (first and still well regarded history of California)

The Religious Aspect of Philosophy

The Spirit of Modern Philosophy, The World and the Individual

The Feud at Exfoliate Creek (a novel)

William James and Other Essays on the Philosophy of Life

The Problem of Christianity

Logical Essays

Lectures on Modern Idealism (remarkably edifying)

Earned four doctoral degrees in philosophy

Arguably the finest American philosopher in the 1885-1915 era

Founded Harvard's School of Logic

Remarkably clear exposition of Immanuel Kant

Masterful synthesis of philosophy and religion

Argued that all reality is gathered in one **Absolute** mind, of which our minds are only small parts

Wanted to be a mining engineer, but turned to philosophy via Aeschylus' *Prometheus Unbound*

<http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/royce-josiah.pdf>

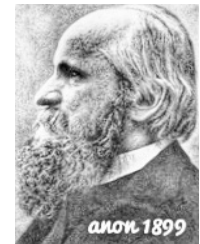
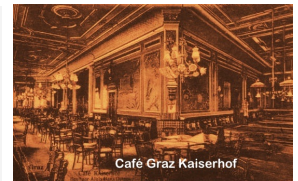
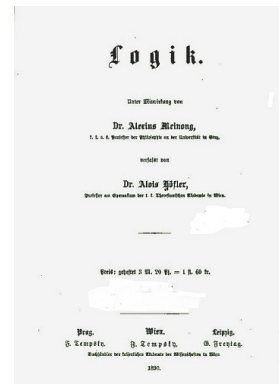
TOC

It is only with great difficulty
that the notion of **logic** can be separated
from that of a technology [and psychology]
devoted to the advancement
of our intellectual powers.

Consequently, **logic** always remains
a “practical discipline.”

Even if one speaks quite naturally
of inferences and syllogisms,
one means intellectual events,
or the possible results of such an events,
just as one means a physiological event
when one speaks of the circulation of the blood.*§

§ Notwithstanding, Meinong develops a grand philosophy in which logic
does have an existence apart from psychology and technology.



Alexius Meinong

Austrian, born, Lemberg, Galicia, 1853

*“The Theory of Objects”

On Philosophical Science and its Propaedeutics

Logic (with Alois Hofler)

Psychological-Ethical Investigations in Value Theory

On Assumptions, On Emotional Presentation

“On Possibility and Probability”

Early a student of [Franz Brentano](#)

Forty years professor at Universität Graz

Established the first fully functioning psychology laboratory

Almost totally blind, eschewed gatherings, conferences, public lectures

Succeeded by hard discipline and great determination

With [Edmund Husserl](#), a leading force in the Phenomenology movement

Held that psychology to be an empirical science dealing with extraordinary realities

Though Catholic, an intense critic of church controlled society, especially education

<http://biography.yourdictionary.com/Alexis-ritter-von-handschuchsheim-Manning>

<http://www.jnfindlay.com/findlay/meinong/>

http://lithes.uni-graz.at/handbuch/meinong_alexius.html

Pure **logic**:

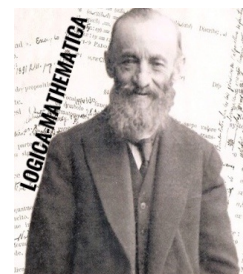
All its propositions are of the form:
'If one supposes A, then B is true.'

But these **logical** constructions
must not be made
for the mere pleasure
of reasoning about them.

The object studied by them
is given by the experimental sciences;
they must have a practical goal.*



Formulaire de Mathématiques



Giuseppe Peano

Italian, born Sepinetta, 1858

Forms of Mathematics, 5 volumes

*"Review of A. Nantucci," *The Concept of Number and its Extensions*

A truly major figure in Mathematics and formal analysis

Professor of mathematics at the University of Turin and Military Academy in Turin

Calculus, differential equations, foundations of arithmetic, geometry, set theory, iota

Praised by [Bertrand Russell](#) for

"extending the region of mathematical precision backwards towards regions
which had been given over to philosophical disagreement"

Founded the Review of Mathematics, a leading international periodical

Constructed, advocated Interlingua, a neo-Latin language given to exactness and clarity

Committed to enhanced training for secondary school teachers, especially women

Purchased and then succeeded well in a printing company

Comment from his acclaimed student Alessandro Padoa:----->

On the one hand, philosophers prefer to speak of logic without using it;
while on the other hand mathematicians prefer to use it without speaking of it,
and even without desiring to hear it spoken of.

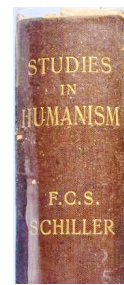
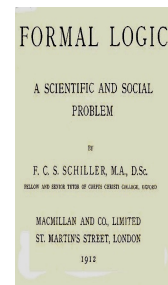
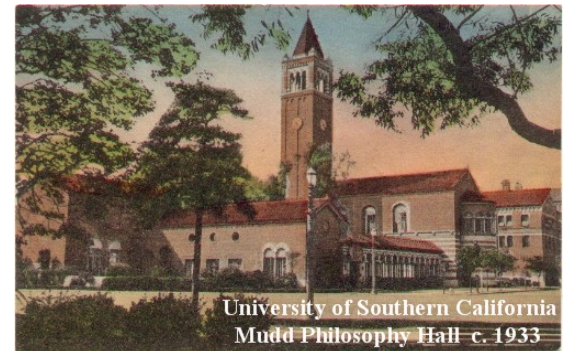
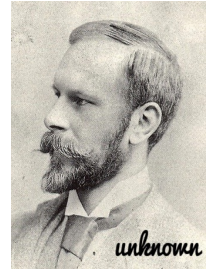
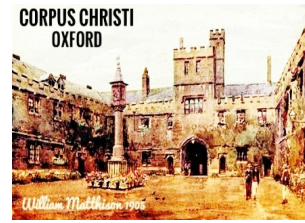


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It is because of their practical effects
that the false ideals of formal **logic**
are worthy of mention.

Formalism's ideal of the motion of thought
is that it should be, not free, but compulsory.....
The scientific readiness to learn from experience,
to adjust rules to cases, to modify formulas
as the facts seem to require,
and generally to handle “facts” and “laws”
with the utmost freedom,
as if they were relative to each other
and to human desires to control phenomena,
must seem utterly repulsive to formal **logic**.*

The formal **logician** can never, as such,
claim to be the final judge of the value of any argument.
He can never by his 'rules'
preclude the examination of its 'material' worth;
however formally perfect the syllogism which expresses it,
a fatal flaw may lurk in its actual application;
however grotesque its formal fallacy,
a road to truth may be barred by its rejection.**



F. C. S. Schiller

Born Altona, Holstein, 1864, but never a citizen of any country; yet somehow given a British travel pass

Formal Logic: A Scientific and Social Problem*, *Studies in Humanism*

Rugby School and Balliol College, Oxford; later, Fellow of Corpus Christi College, Oxford

Still later, professor at the University of Southern California

Important contributor in Pragmatism, following [Peirce](#), [James](#), and [Dewey](#):

“Human interest, then, is vital to the existence of truth; to say that a truth has consequences and that what has none is meaningless means that it has a bearing upon some human interest. Its “consequences” must be consequences to someone engaged on a real problem for some purpose.” **

Staunch detractor of formal, symbolic, and mathematical logic

Argued that they constrict inquiry and progress, that logic simply cannot be detached from content

Strongly opposed to communism, but somewhat approving of fascism

Lifelong (but skeptical) psychical researcher

Dedicated popularizer of philosophy

Supported the Eugenics Movement, writing three books on it

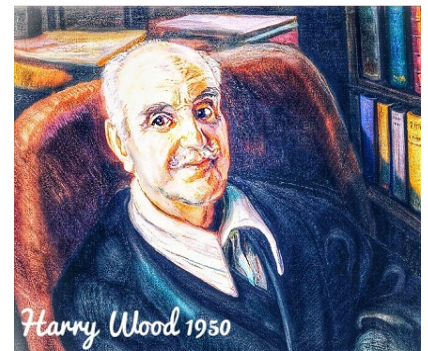
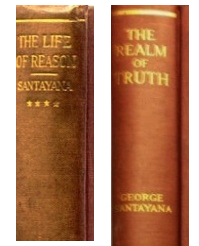
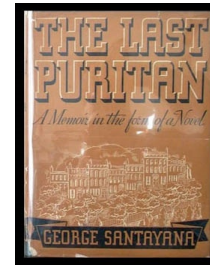
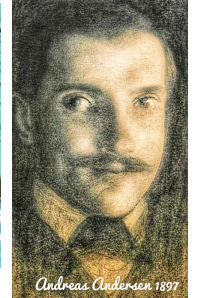
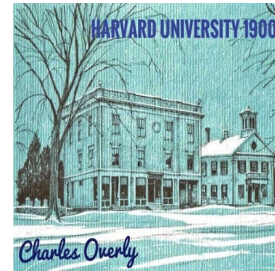
http://d-scholarship.pitt.edu/7625/1/mjporrovecchio_ETD_May2006.pdf

<http://archive.org/details/formallogicscie00schiuoft>



Logic loses its authority and becomes inept,
if it tries to disclose existences.*§

But **logic is only logic** and the systems of relation
discoverable amongst essences
do not constitute truths,
but only other more comprehensive essences,
within which the related essences figure as parts.
The systems, like the **logical** elements,
become a means of expressing truth
only when truth can be otherwise discovered
and brought face to face
with our deductive reasonings.**



George Santayana

Spanish, born Madrid, 1862

**The Life of Reason*

***The Realm of Truth*

The Sense of Beauty; Scepticism and Animal Faith *The Last Puritan* (highly successful novel)

Came to the USA at age 6, but remained Spanish citizen for life

Harvard graduate then professor, best selling novelist, poet, cultural/literary critic

A committed materialist, while never disavowing Catholicism

Argues that taste and judgment move mankind beyond ordinary experience

A social critic: **“Those who cannot remember the past are condemned to repeat it.”**

Uneasy in picayune academe, retired at age 49 to live last 40 years in Europe

Against his direction, buried in Rome’s notable Panteón de la Obra Pía Española

§ That is, as [George Boole](http://www.george-santayana.org) first pointed out, even though all unicorns are horses, it does NOT logically follow that some unicorns are horses. Be there any unicorns then they would be horses (one-horned at that), but whether unicorns do or do not exist is an factual question.

<http://www.george-santayana.org>

<http://www.poemhunter.com/george-santayana/biography/>

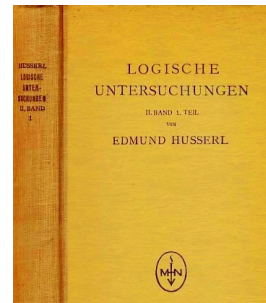
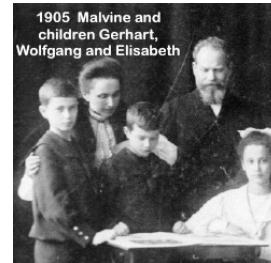
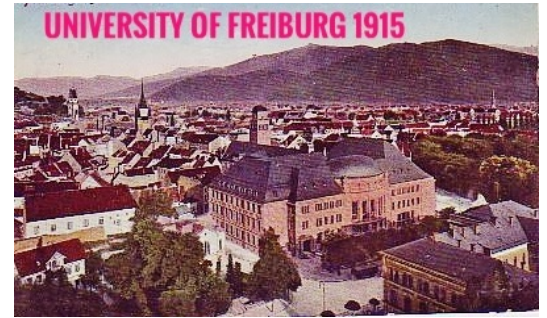
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Logic does not enquire
into the causal origins or consequences
of intellectual activities,
but into their truth-content:
it enquires what such should be like,
or how they should proceed,
in order that the resultant judgments
should be true.

Correct judgments and false ones,
evident ones, and blind ones,
come and go according to natural laws,
they have causal antecedents and consequences
like all mental phenomena.

Such natural connections do not, however,
interest the **logician**;
he looks rather for ideal connections
that he does not always find realized,
in fact only exceptionally finds realized
in the actual course of thoughts.

He aims not at a physics, but at an ethics of thinking.*



Edmund Husserl

German, born Prossnitz, Moravia, 1859

**Logical Investigations*

Introduction to Logic and Theory of Knowledge

Ideas in three groundbreaking volumes

Formal and Transcendental Logic, Cartesian Meditations

Born and raised Jewish, married a Jewish woman, both Lutheran converts at age 25

Doctorate in mathematics at the University of Vienna

Student of and much influenced by [Franz Brentano](#)

Founder of and primary expositor of Phenomenology

Sought a non-speculative, non-spiritual, non-metaphysical understanding of experience

Honored professor at Göttingen and Freiburg universities

Under Naziism, ostracized from academe due to his Jewish heritage

Refused California professorship, staying in Nazi Germany for the sake of a friend

Died one year before the start of the war

Collected manuscripts fill 40,000 pages

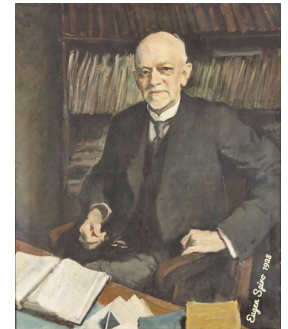
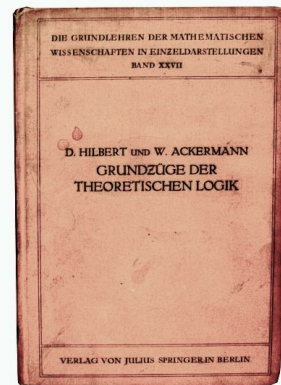
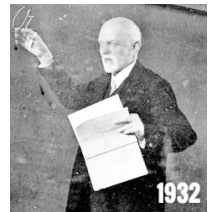
“Sein leben und sein sterben war stilles heldentum.” Frau Malvine geb Steinschneider

<http://www.marxists.org/reference/subject/philosophy/works/ge/husserl2.htm>

<http://archive.org/details/IdeasPartI>

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The purpose of symbolic language
is to achieve in **logic**
an exact scientific treatment
of its subject matter
free from the ambiguities
so common in ordinary language.
The transition from statements
to their consequences,
as occurs in
the drawing of conclusions,
is analyzed into primitive elements
and appears
in a formal transformation
of the initial formulas in
accordance with certain rules.*



David Hilbert

Prussia (German Empire), born Königsberg or Wehlau, 1862

**Principles of Mathematical Logic*, with his student Wilhelm Ackermann

“Logic and the Knowledge of Nature”

Logical Foundations of Mathematics, with his major collaborator Paul Bernays ----->

“Geometry and the Imagination”; “On the infinite”

Acclaimed (save [Poincaré](#), [Russell](#), [Gödel](#)) the greatest logician/mathematician of the time

In 1900, set forth 23 “Problems” (some still unsolved) that continue to enthrall mathematicians

Leading figure in the prominence of Göttingen University

Insisted on the possibility of an algorithm that can decide the truth or falsity of **any** statement in **all** of logic

But eventually [Gödel](#), [Church](#), and [Turing](#) proved that such an algorithm is impossible!

Most colleagues lost in the Nazi Holocaust, isolated in Germany, his 1943 burial largely neglected

On gravestone, his famous dictum—“**We must know, we will know.**”

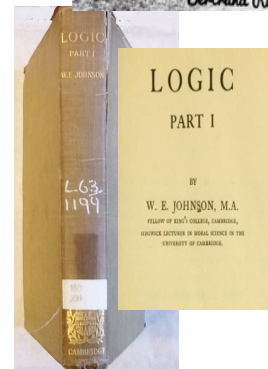
Lunar crater named for him

In Memorium by [Hermann Weyl](#)

<http://www.ams.org/journals/bull/1944-50-09/S0002-9904-1944-08178-0/S0002-9904-1944-08178-0.pdf>



To charge the fundamental principles of **logic** with being mere truisms is not to condemn them, but to admit that they are fitted to fulfil the function for which they are intended. It is an actual fact that by means of truisms and truisms alone we can demonstrate truths which are not truisms.*



William Ernest Johnson

British, born Cambridge, 1858

**Logic*

“The Logical Calculus”, “The Pure Theory of Utility Curves”

“On the Theory of Logical Equations”, “Analysis of Thinking”

Entire life at Cambridge: school, then student, Fellow of King’s College Cambridge

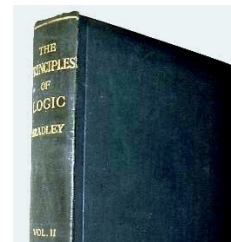
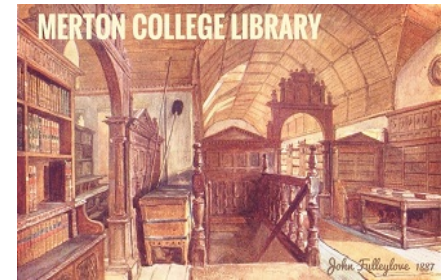
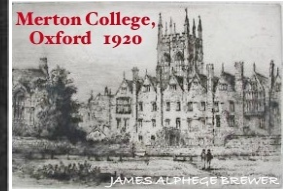
Developed basic concepts later espoused by more famous mathematicians and economists

Frail, shy, but enjoyed playing piano at gatherings in his rooms

<http://archive.org/details/logic01john>

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It is impossible that there should be
fixed models for reasoning;
you can not draw out
exhaustive schemata of valid inference.
The attempt to manufacture them
would lead to the search
for a completed infinity.
[But] if a schema will prove
a false conclusion
from premises which are true,
then that schema must be **logically** vicious,
and its Canon, which serves as a test,
must be false.*



Francis Herbert Bradley

British, born Clapham, Surrey, 1846

**The Principles of Logic*

Ethical Studies, Appearance and Reality

Fellow for 54 years of Merton College, Oxford

Acclaimed then and still as the foremost British philosopher of his generation

Propounded that everything real is rational and vice versa.

Argued strongly against hedonism and utilitarianism

Highly reclusive and never married

First ever philosopher appointed to the Order of Merit ([see more here](#))

Strong influence on T. S. Eliot

Occasionally spent the night out on the college grounds shooting cats

<http://www.archive.org/details/principlesoflogi013753mbp>

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It is impossible to deal with **logical** questions
save in connection with
definite metaphysical and epistemological principles.
Logic, as the theory of the mind's rational processes
in regard of their validity, must necessarily be part
of a larger philosophical system.

Indeed when this is not the case
it becomes a mere collection of technical rules
possessed of little importance and of less interest.

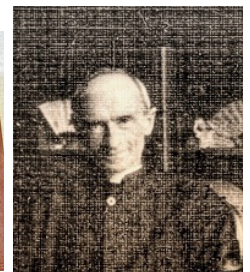
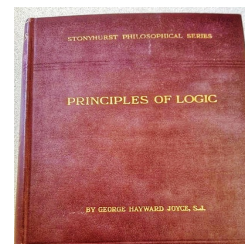
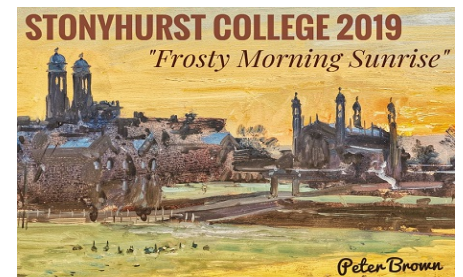
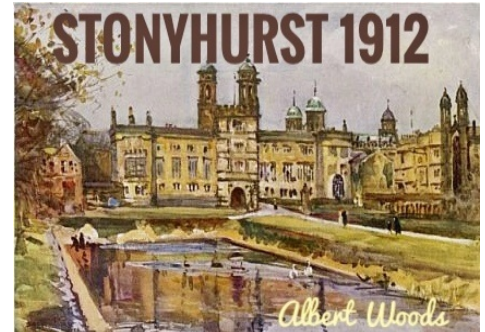
....

Formal **logic** considers the mental processes
in entire abstraction from
the relation which the concept bears to the real order.

And Symbolic **logic** is a further development of it.

However, it is difficult to see
that Symbolic **logic** can lead to anything.

The root of the evil lies
in the confusion on the part of many men of great ability
as to the true character of **logic**.*§



George Hayward Joyce, S.J.

British, born Harrow-on-the-Hill, 1864

**Principles of Logic*

Principles of Natural Theology

Ordained Anglican deacon, then entered the Catholic church becoming an ordained priest

Awarded Classical Scholarship at Oriel College, Oxford

Professor of Logic/Epistemology at Stonyhurst College; Dean of Theology at Heythrop College, London

A truly masterful neo-scholastic presentation of the science of logic

Well executed in contemporary language and devoid of medieval verbiage

Yet both an ill-informed and ill-considered rejection and denial of the Frege/Russell upheaval in logic

Served summers at Farm Street Church in Mayfair (see [Richard Frederick Clarke](#))

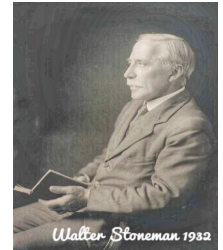
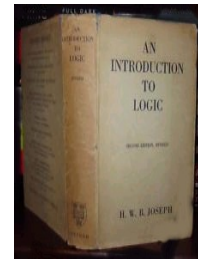
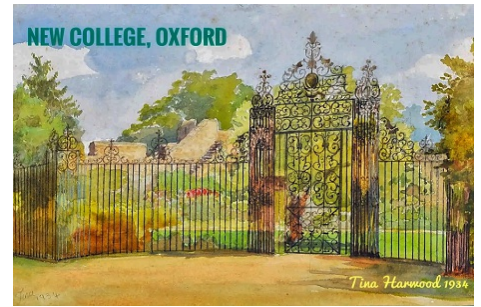
§

An interesting near parallel to Philip Jourdain's comment regarding [Louis Couturat](#)

<https://archive.org/details/principleslogic00joycuoft>

<https://archive.org/details/principlesofnatu00joycuoft>

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If **logic** is a science, it must have a subject of its own,
in which it seeks for principles and laws.
That subject is thought, the most general forms of which
exist diversely modified in thinking about different subjects.
But although the forms of our thought cannot be studied
apart from the differences connected with
the particular sort of subject about which we may think,
yet **logic** is not interested in these differences
for their own sake, but only for the sake
of the divers forms of thinking involved in them;
and so far as the same form is exemplified
over and over again in different particular 'bits' of thinking,
the study of the common form alone belongs to **logic**.[§]

....

It is not the business of **logic** to make men rational,
but rather to teach them
in what their being rational consists.
And this they could never learn,
if they were not rational first.*

Horace William Brindley, "H. W. B." Joseph

British, born Rochester, 1867

* *An Introduction to Logic*

Some Problems in Ethics, Essays in Ancient and Modern Philosophy, Justice and Wages

Student, Tutor, Fellow for 52 years at New College, Oxford

Held fast within the Aristotelian formula amidst logic's post-Frege transformation

Fellow, British Academy and Chairman of its Philosophy section

Argued strongly against Marx's communism

Historian A. L. Rowse recalled: "Joseph at New College was celebrated in his day for the inhuman rigour of his logic. Ordinary humans were depressed by it, some given nervous breakdowns, but some emerged unscathed from the Josephian mincing machine."

Economist Roy Harrod, "Joseph's philosophy was intellectually defective and may even have set up in his pupils habits of incorrect thinking about practical matters; nevertheless, he was concerned with the ultimate problems confronting mankind, and the mere fact that undergraduates have been induced to dwell upon these problems gave them a sort of moral stuffing and a sense of purpose in life thereafter."

Bicycled 70 miles on his 70th birthday

§
harmlessly compressed here

<https://archive.org/details/introductiontolo00jose>

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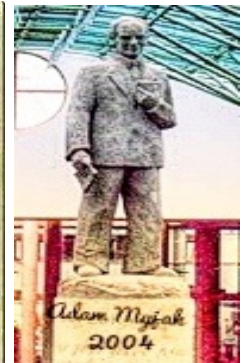
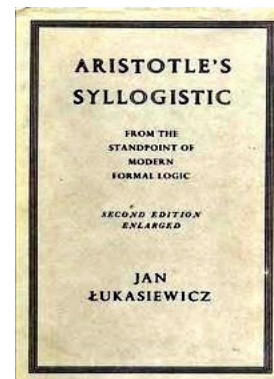
The difference between a thesis
and a rule of inference
is from the standpoint of **logic**
a fundamental one. *

It is not easy to predict
the impact of non-Chrysippian[§] systems of **logic**
upon philosophical speculation.

It seems however that
the philosophical importance
may be at least as great as the importance of
non-euclidian systems of geometry.**

Logic is morality of thought and speech..

Reliable hearsay, see [Jan Woleński](#)



Jan Łukasiewicz

Polish, born Lwów, Galicia, 1878

* *Aristotle's Syllogistic from the Standpoint of Modern Formal Logic*

** "Philosophical Remarks on Many-Valued Systems of Propositional Logic"

Elements of Mathematical Logic

"Logistic and Philosophy", "Concerning the Method in Philosophy"

Handed a diamond studded "Doctoral Ring" by Emperor Franz Joseph

Professor Extraordinaire at University of Warsaw

Leading figure amongst the remarkable assemblage of Polish logicians

At great risk, remained in Poland during the war

Active in the Underground University

Dreading life under communism, fled to the West just before the Warsaw Uprising disaster

Final 10 years, Lecturer in Logic at University College, Dublin

[§] The five logic axioms of [Chrysippus](#) rest upon a 2-value assumption: every proposition is True or False (and no other). Łukasiewicz is the first to explore and develop 3-value systems in which propositions are True/False/Other, that has evolved into Fuzzy Logic, even fuzzy digital architecture

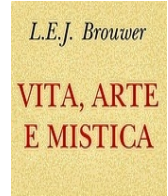
<https://www.porta-polonica.de/en/atlas-of-remembrance-places/jan-lukasiewicz>

Logic is life in the human brain;
it may accompany life outside the brain
but it can never guide it
by virtue of its own power.

Indeed, if there is a harmony of will,
logic may well fall by the wayside.

For example, the simultaneous pronouncements
“There is no evil” and “There is nothing but evil”
may well express ‘unity of meaning’
and might be simplistically characterized
by saying that its adherents
refuse to use the law of excluded middle.*

cf. [Kolmogorov](#)



L. E. J. Brouwer

Dutch, born Overschie, Netherlands, 1881

**Life, Art and Mysticism*

The Untrustworthiness of the Principles of Logic, Philosophy and Foundations of Mathematics

Cambridge Lectures on Intuitionism, Geometry, Analysis, Topology and Mechanics

Rejected some never before questioned canons of logic such as ‘P or not-P’ and ‘If not-not-P then P’

University of Amsterdam from student to Eminent Professor

Insisted that there is no truth outside the activity of constructing and thereby achieving it

In his own words, **“There are no non-experienced truths”**

Losing his notebook on a bus, changed his primary interest from mathematics to philosophy

Both praised and rebuked for conduct amid the harsh wartime Germany occupation

Died at age 85 when struck by a car in front of his house

Lunar crater named for him

<http://www.marxists.org/reference/subject/philosophy/works/ne/brouwer.htm>

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In **logic**, a judgment which I pronounce,
affirms a certain set of circumstances;
it takes them as true.

The philosophical question of the meaning of
and the justification for this thesis of truth arises;
the idea of objective truth is not denied,
but becomes a problem which has to be grasped
from what is given absolutely.

“Pure consciousness” is the seat
of that which is philosophically a priori.

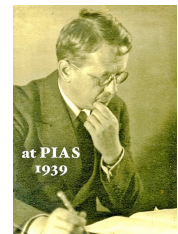
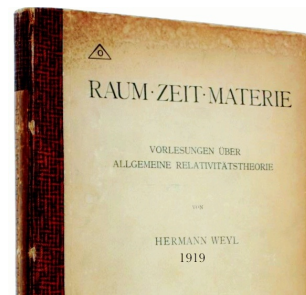
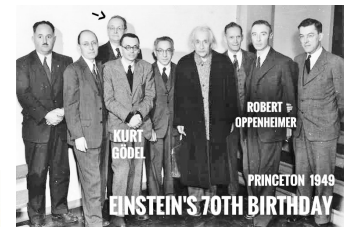
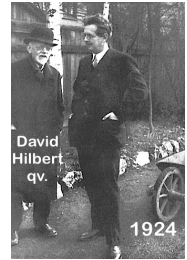
On the other hand, a philosophic examination
of the thesis of truth must and will lead
to the conclusion

that none of these acts of perception, memory, etc.,
which present experiences from which I seize reality,
gives us a conclusive right to ascribe
to the perceived object an existence
and a constitution as perceived.

This right can always in its turn be over-ridden
by rights founded on other perceptions, etc.*

Logic is the hygiene[§]
that keeps ideas healthy and strong.

American Mathematical Monthly, November, 1992



Hermann Weyl

German, born Elmshorn, 1885

**Space, Time, Matter*

The Continuum : A Critical Examination of the Foundation of Analysis

Philosophy of Mathematics and Natural Science

Most famous graduate of the renowned Gymnasium Christianeum (above)

A major figure in contemporary mathematics and physics

Repulsed by Nazism, with his Jewish wife escaped to the USA

Lived and worked at Princeton's Institute for Advanced Study

Returned to Europe several years after the war

Lunar crater named for him

§ cf. hygiene in [Rudolf Carnap](#)

<http://www.weylmann.com/>

The **logical** principle of the excluded middle
not only does not help to resolve
logical problems of various kinds,
but is in fact a dangerous theoretical obstacle
which should therefore be removed from science....

Let us suppose that I am to answer the question
of whether the following propositions are true:

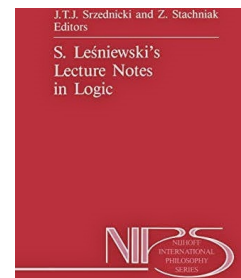
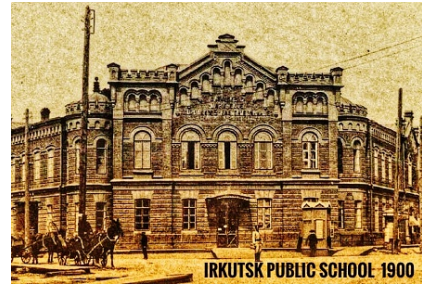
‘every centaur has a tail’,

‘a certain centaur does not have a tail’.

If we take into account our analysis above,
the answer to this question becomes quite easy.

Each of the propositions is obviously false
because the subject of each denotes nothing.

The word ‘centaur’ denotes nothing
because no object is a centaur.*



Stanisław Leśniewski

Polish, born Serpukhov (Russia) 1886

* “The Critique of the Logical Principle of the Excluded Middle”

“On the Foundations of Mathematics” *Lecture Notes on Logic*

“Fundamentals of a New System of the Foundations of Mathematics”

Completed public school (above) in Irkutsk – “The Paris of Siberia”

Studied with notables in Germany; Doctorate 1912, Lwów University, Poland

In Moscow during the Great War teaching high school mathematics

Went back to Poland after the 1917 Bolshevik Revolution, never to return

Was a codebreaker aiding Poland's survival in the 1919–21 war with Communist Russia

Launched the renowned school of logic in Warsaw

Became Extraordinary Associate Professor at Warsaw University, full professor 17 years later!

Primary contribution was three nested formal systems: protothetic, ontology, and mereology.

Rules on use/mention, canons of correct definition, and mereology guided modern logic

One of the founders of the distinction between objectlanguage and metalanguage

Rejected the prevailing axiomatic set theory and devised an alternative

Only one doctoral pupil--[Alfred Tarski](#)

A chain smoker, died aged 53 of thyroid cancer shortly before Germany invaded Poland in 1939

Papers destroyed during the tragic Warsaw Uprising of 1944

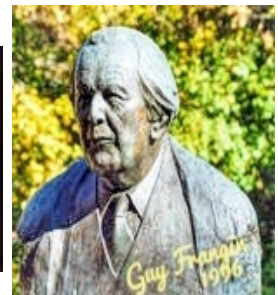
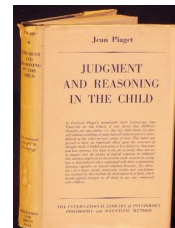
<https://www.ontology.co/lesniewskis.htm>

<https://www.uni-log.org/ULS6-lesniewski.html>

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For what is **logic** but the art of proof ?
To reason logically is so to link one's propositions
that each should contain the reason
for the one succeeding it,
and should itself be demonstrated
by the one preceding it.

Or at any rate, whatever the order adopted
in the construction of one's own exposition,
it is to demonstrate judgments by each other.
If, therefore, the child remains for a long time
ignorant of the need for demonstration,
this is bound to have an effect
upon his manner of reasoning.*



Jean Piaget

French, born Neuchâtel, 1896

**Judgment and Reasoning in the Child*

The Language and Thought of the Child .

The Growth of Logical Thinking from Childhood to Adolescence

The Early Growth of Logic in the Child, Intellectual Evolution from Adolescence to Adulthood

To Understand is to Invent; The Future of Education

Instrumental in developing the Benet intelligence test

Ranking professor at several European Universities

Forty years as director of the International Bureau of Education

Insisted, as did [John Dewey](#), that early learning activities should involve motor and mental operations

Recognized for research, theory, and reforms in education

“The principle goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done – men who are creative, inventive and discoverers.”

At age 11 wrote a short scientific paper on the albino sparrow

As a teenager, published well received papers on mollusks

<http://www.piaget.org/aboutPiaget.html>

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We shall attempt to indicate
the way in which **logic** has developed
from the science of reflective thinking, or reasoning,
to the science of form.*

It is not easy to make clear
exactly in what sense of “necessary”,
logical principles are necessary.

It is simple enough to assert that their truth is self-evident,
and that a self-evident truth must be necessarily true.

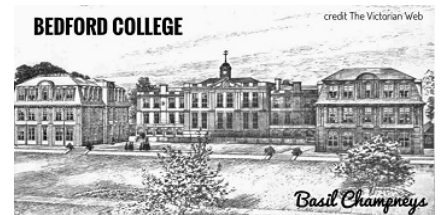
But self-evidence is a dangerous notion;
it seems to combine obviousness and **logical** priority.

What is obvious to one person is not to another;
it depends in part upon keenness of mental vision
and in part upon familiarity.

Unfortunately, we have learnt that a proposition
which has long been regarded by competent thinkers
as self-evident turns out to be false.

What is indubitable is not necessarily true;
our capacity to doubt depends upon
our previous knowledge and our mental agility.

We must be content to assert here
that **logical** principles are so fundamental to our thinking
that without presupposing them we could not think at all.**



1927 graduates



L. Susan Stebbing

British, born North Finchley, London, 1885

**A Modern Introduction to Logic* (first modern logic text by a woman)

***A Modern Elementary Logic*

Logical Positivism and Analysis, Logic in Practice

Philosophy and the Physicists, Thinking to Some Purpose

Graduate Girton College, 1908 (cf. [Constance Jones](#))

Student of [William Ernest Johnson](#)

Twenty-three year tenure at women's Bedford College, London

First ever woman full professor of philosophy in Great Britain

An active proponent of logical positivism; founder of the journal *Analysis*

A cogent analytical critic of the basis and implications of modern physics

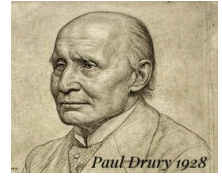
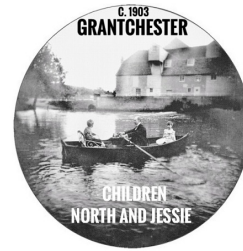
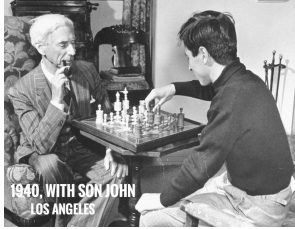
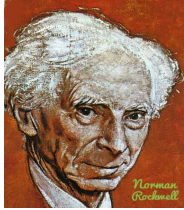
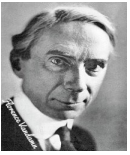
President of the Mind Association and the Aristotelian Society

While visiting a professor at Columbia, enjoyed the view from atop the Empire State Building.

<http://archive.org/details/modernelementary001072mbp>

http://www.hist-analytic.com/susan_stebbing.htm

Link to The Victorian Web <http://www.victorianweb.org/art/architecture/champneys/7.html>



**Principia Mathematica.*

Hailed as the most significant work in logic since Aristotle

We must, to begin with, distinguish between a proposition as a fact and a proposition as a vehicle of truth or falsehood. The following series of black marks: “Socrates is mortal” is a fact of geography. The noise which I should make if I were to say “Socrates is mortal” would be a fact of acoustics. The mental occurrence when I entertain the belief “Socrates is mortal” is a fact of psychology. None of these introduces the notion of truth or falsehood, which is, for **logic**, the essential characteristic of propositions... We must not be misunderstood. It does not matter, for mathematical **logic**, what constitutes truth or falsehood; all that matters is that they divide propositions into two classes according to certain rules.*

Bertrand Russell [\[Find postage stamp\]](#)

Alfred North Whitehead

Knowledge of **logical** forms is something quite different from knowledge of existing things.*

Without deductive **logic** science would be entirely useless.*

British, born Trellech, Monmouthshire, Wales, 1872

**Our Knowledge of the External World*

Introduction to Mathematical Philosophy

On Denoting, The Analysis of Mind

The Problems of Philosophy

An Outline of Philosophy

Appointed to the Order of Merit ([more here](#))

Began as Whitehead's student

Logician, philosopher, mathematician

Discovered a fundamental paradox in Set Theory

Very exercised by “Scott is the author of Waverley”

Applauded eugenics, scorned non-Europeans

Imprisoned for pacifism during the Great War

Ever a peace activist and free-love advocate

One day out bicycling, realized he no longer loved his wife, so just kept on pedaling.

British, born Ramsgate, Kent, 1861

**The Aims of Education*

Science and the Modern World

The Concept of Nature, Process and Reality

Adventures in Ideas

Appointed to the Order of Merit ([more here](#))

Later, focused on Metaphysics and Cosmology

Masterful in the History of Ideas

Major exponent of Process Philosophy

Distinguished Professor:

Trinity College, Cambridge, UK

Imperial College, London

Harvard University, USA

Hosted open house every weekend

Ordered all papers destroyed at death

Had no funeral as he requested

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Scientific method both constitutes and discloses
the nature of **logical forms**.*

Traditional and contemporary **logic**
express the last result of discriminative analysis
employed in the search for dependable inference.

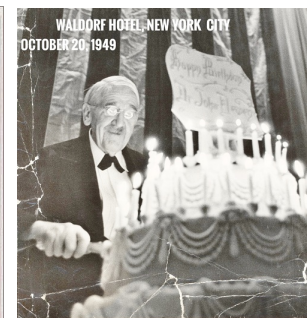
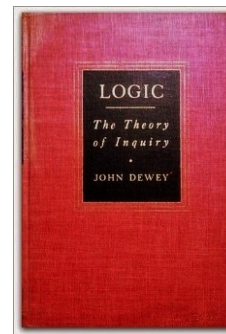
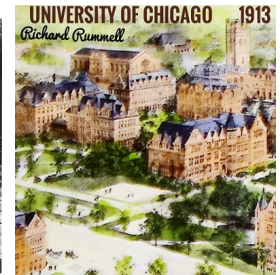
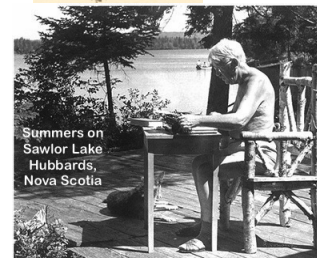
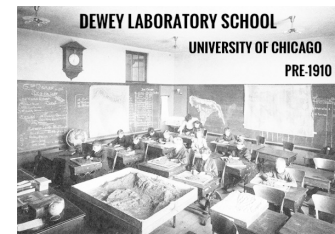
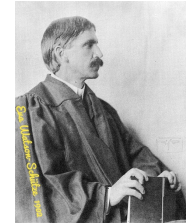
Improve the means of experimentation
and that result may be replaced tomorrow
by new apprehensions.**

The Greeks [see Plato's *Meno*] acutely raised the question:
How can we learn?

For either we know already what we are after,
or else we do not know. In neither case is learning possible;
on the first alternative because we know already;
on the second, because we do not know what to look for,
nor if, by chance, we find it,
can we tell that it is what we were after.

Taken by itself, the Greek argument
is a nice piece of formal **logic**.

However, the dilemma makes no provision
for coming to know, for learning;
it assumes either complete knowledge or complete ignorance.
Nevertheless the twilight zone of inquiry, of thinking, exists.
The possibility of hypothetical conclusions, of tentative results,
is the fact which the Greek dilemma overlooked.***



John Dewey

(90th birthday—also see [Suppes](#) and [Popper](#))

American, born Burlington, Vermont, 1859

* *Logic: The Theory of Inquiry*

** *Essays in Experimental Logic*

*** *Democracy and Education*

Experience and Nature, The Quest For Certainty

Acclaimed for leadership in redefining the principles, goals, and methods of education

His legacy epitomized by the dictum—"Learn by Doing"

Originated Laboratory Elementary School programs

Following [Peirce](#) and [James](#), the principal elaboration and extension of Pragmatism

Argued for an essential social/practical basis in all knowledge and inquiry, even logic itself!

Forty books and 170 articles

Traveled worldwide advocating democratic reforms in society and education

<http://www.anb.org/articles/20/20-00289.html>

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<http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/dewey-john.pdf>

Logic treats whatever belongs
to a thinking about anything at all,
treats that which makes thinking, as such,
intrinsically possible,
treats the lawfulness that
every thinking, as thinking, must satisfy.
[But] only what exists as a free
being could be at all
bound by an obligatory lawfulness.

Freedom alone
can be the source of obligation.

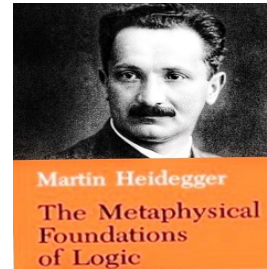
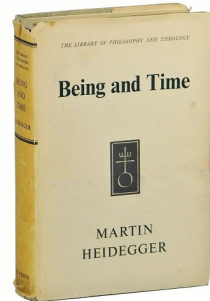
A basic problem of **logic**,
the law-governedness of thinking,
reveals itself to be, in its ground,
a problem of human existence
the problem of freedom.*§



right, with [Edmund Husserl](#)



with [Ernst Cassirer](#)



Martin Heidegger

German, born Messkirch, 1889

**The Metaphysical Foundations of Logic*

Being and Time (famed groundbreaking work in Existentialism)

Logic as the Question Concerning the Essence of Language

Basic Questions of Philosophy, Basic Concepts

Professor at the University of Freiburg

Highly prominent in post-Nietzsche continental philosophy

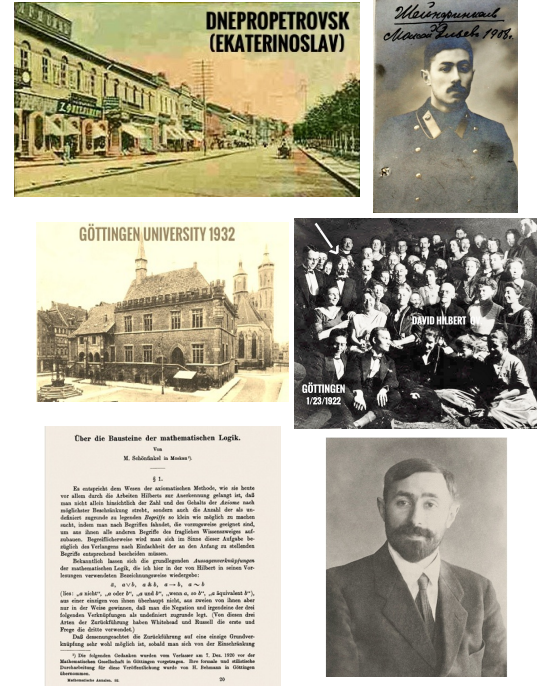
Major works in phenomenology, history of philosophy, aesthetics, modern culture, literary criticism,.....more

Sought out logic's philosophical grounding, apart from its scientific-formalist superstructure

Joined and supported Germany's Nazi party, praised Hitler, later lamenting **“the greatest mistake of my life”**

§ That is, do the laws of logic encroach upon man's existential freedom? Heidegger's answer –“No”– derives from his vast general philosophy.

A variable in a proposition of **logic** is, after all, nothing but a token that characterizes certain argument places and operators as belonging together; thus it has the status of a mere auxiliary notion that is really inappropriate to the constant, "eternal" essence of the propositions of **logic**.*



Moses Schönfinkel

§ Russian, born Dnepropetrovsk (Ekaterinoslav), Ukraine, 1888

* “On the Building Blocks of Mathematical Logic”

“On the Decision Problem of Mathematical Logic”

Engineer in the army of the Tzar

Graduated Novorossiysk University, Odessa

Fortunately went to Göttingen University in Germany one month before the Great War

There 10 years to study mathematics; attaining status in the [David Hilbert](#) circle

Launched Combinatory Logic– archetype of the λ -calculus for computer machine language

Moved back to Russia, but his life densely clouded by sovietization and later Stalinism

Died soon after the 1942 Battle of Moscow

Never seen papers said to have been burned

§ We highly recommend the biographical research by the well known scholar [Stephen Wolfram](#).

Original 1920 paper read at Göttingen

<https://courses.engr.illinois.edu/cs522/sp2016/OnTheBuildingBlocksOfMathematicalLogic.pdf>

A gentle and humorous introduction to Combinatory Logic

https://en.wikipedia.org/wiki/To_Mock_a_Mockingbird

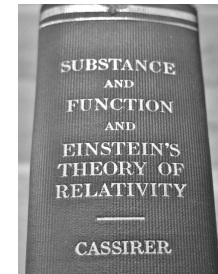
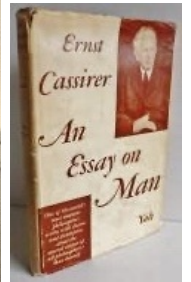
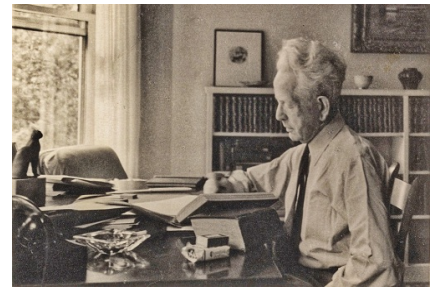
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Ancient **logic** is entirely founded
on the relation of 'subject' and 'predicate',
on the relation of the given concept
to its also given and final properties.

It seeks finally to grasp
the absolute and essential properties
of absolute self-existent substances.

Modern **logic**, on the contrary,
in the course of its development,
comes to abandon this ideal
and transforms **logic** into a pure doctrine
of form and relation.

The possibility of all determinate character
of the content of knowledge
is grounded, for it, in the laws of these forms,
which are not reducible to mere relations of subsumptions,
but include equally all the different possible types
of relational construction
and connection of elements of thought.*



Ernst Cassirer

German, born Breslau, 1874

* *Einstein's Theory of Relativity*

Substance and Function, The Myth of the State

The Philosophy of Symbolic Forms (a groundbreaking masterpiece)

Language and Myth ([Susanne Langer's](#) translation of *Sprache und Mythos*)

An Essay on Man (incisive)

Kant and the Problem of Metaphysics; The Individual and the Cosmos in Renaissance Philosophy

A truly magnificent philosopher and intellectual historian of lasting renown

Portrayed the evolution of basic concepts once held to be unchangeable

Distinguished professor at Hamburg and Berlin

Famous debate with [Martin Heidegger](#) in Davos, Switzerland

Delineated the universal and conceptual impact of the new physics and mathematics

Among a tiny minority of German Jewry, foresaw impending disaster and left before Nazi domination

Eminent at Gothenburg, Oxford, Yale, and Columbia

Photographic memory, but always needed written instructions to fill his fountain pen

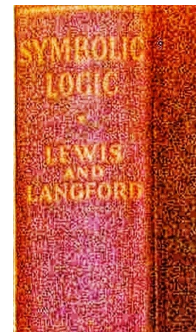
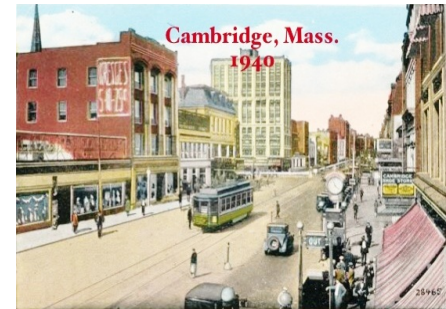
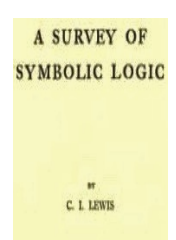
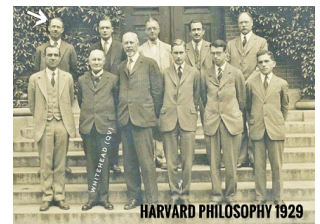
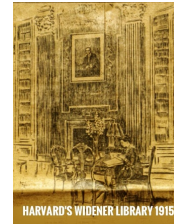
<http://archive.org/details/substanceandfunc00cassuoft>

<http://philpapers.org/archive/MORAVD.3.pdf>

Symbolic **logic** is the development of the most general principles of rational procedure, in ideographic symbols, and in a form which exhibits the connection of these principles one with anotherThe important characteristics of this form are:

- (1) the use of ideograms instead of the phonograms of ordinary language;
- (2) the deductive method which may here be taken to mean simply that the greater portion of the subject matter is derived from a relatively few principles by operations which are exact;
- and (3) the use of variables having a definite range of significance.*

The extended use of symbolic procedures opens up so much that is both new and important that symbolic **logic** becomes an immensely deeper and wider study than the **logic** of tradition.**



C. I. Lewis

American, born Stoneham, Massachusetts 1883

**A Survey of Symbolic Logic*

Gathering the important primary works in symbolic logic into its first textbook exposition

And the first to add modal operations (possibility, necessity)

***Symbolic Logic*, with Cooper H. Langford (leading textbook for many years)

Mind and the World Order: Outline of a Theory of Knowledge (highly acclaimed)

An Analysis of Knowledge and Valuation, Our Social Inheritance, The Ground and Nature of the Right

Clearly nurtured and sustained by post-Kant Idealism

Held to the a priori/a posteriori dichotomy despite the rising tide against it

Argued that knowledge is a product of brute sensory data plus conceptualization

Regarded moral, aesthetic, and value statements just as true (or false) as factual or scientific statements

Insisted that the final arbiter in all philosophy (including logic) is Reflection.

Served in the Army during The Great War

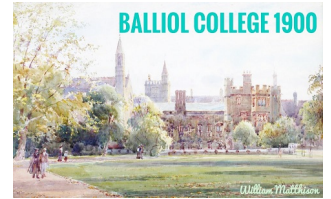
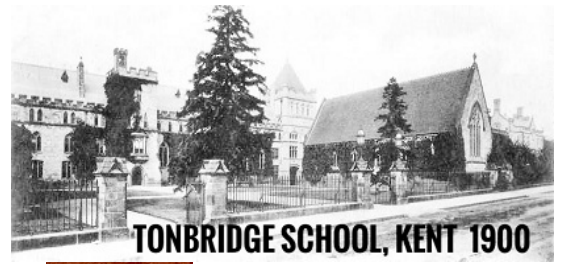
Would refund his own royalty to any student who purchased a Lewis book

<https://archive.org/details/algebraoflogic00coutiala/page/n7/mode/2up>

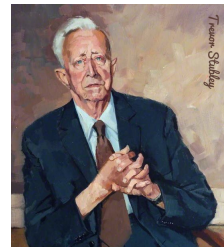
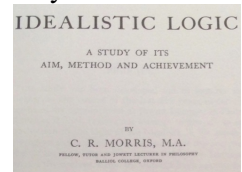
See his interesting connection to the 12th century [Parvipontani](#) ----- footnote 1

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If every particular science must itself alone
be answerable for the validity
of its own reasoning,
and must brook no interference
on the authority of general **logic**,
can there any longer be any such thing as **logic**?
If this were sound, then every science
would have a **logic** of its own.
But this can hardly be the whole truth,
and by examining and comparing
the mind's thinking in the various sciences
we might throw light
on the nature of that activity of mind in general,
which to some extent informs them all.*



Sensory Garden, Charles Morris Hall
University of Leeds



Charles Richard Morris

British, born Sutton Valence, Kent, 1898

**Idealistic Logic: A Study of its Aim, Method and Achievement* (recommended)

Locke, Berkeley, Hume

Student at Tonbridge School, Kent (above)

Philosophy Fellow of Balliol College, Oxford; later Vice-Chancellor, University of Leeds

Visiting professor, University of Michigan, 1926

Respected scholar in British Empiricism and Idealism

A stocky man, fair tending to ruddy, and much more like a Scot than an Englishman

Royal Artillery in France in the Great War

Life peer as Lord Morris, Baron Grasmere

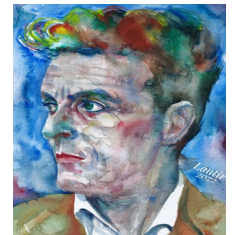
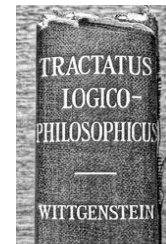
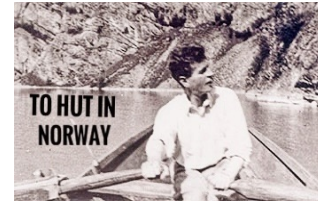
<http://archive.org/details/idealisticlogic029603mbp>

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Logic must turn out to be
of a totally different kind than any other science.

letter to [Bertrand Russell](#), 22 June 1912

Logic is prior to every experience...
Logic is not a theory but a reflection of the world...
Our fundamental principle is that every question
which can be decided at all by **logic**
can be decided without further trouble.
And if we get into a situation
where we need to answer such a problem
by looking at the world,
this shows that we are on a fundamentally wrong track...
In a certain sense we cannot make mistakes in **logic**...
Logic is transcendental.*



Ludwig Wittgenstein

Austrian, born Vienna, 1888

**Tractatus Logico-Philosophicus*

A most insightful and groundbreaking answer to the question “What Is logic?”

Philosophical Investigations

Born to extreme luxury, but gave away his inheritance

Considered one of the most original philosophers of the 20th century

Studied with [Bertrand Russell](#)

Few publications, but highly influential

Universally regarded as the seminal genius in the Philosophy of Language

Served loyally in the army of Austria (against Britain) throughout the Great War

Ten years later, returned to Britain permanently

Decried philosophy and insisted that his students do something “useful” instead

Enjoyed Mickey Mouse cartoons and B-grade cowboy movies

Brother Paul an internationally renowned left-hand concert pianist----->

<http://www.friesian.com/wittgen.htm>



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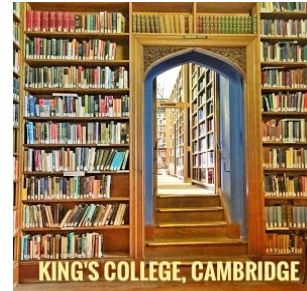
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The triad of critical disciplines
--**Logic**, Aesthetics, and Ethics--
correspond to the three so-called
fundamental values of truth, beauty, and goodness,
but the correspondence is by no means exact.
For, whereas the chief question "What is true?"
is one which all the sciences answer,
each in its own domain, and is in no way
the peculiar concern of **Logic**.

What **Logic** studies is not so much the truth of opinions,
as the reasonableness of arguments or inferences.
As the distinction is an important one,
it may be well to dwell on it.*

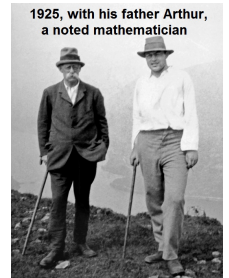
Logic, we may agree, is concerned
not with what men actually believe,
but what they ought to believe.....

In a formally valid argument,
to deny the conclusion
while accepting the premises
would be self-contradictory.**



FRANK PLUMPTON RAMSEY

On Truth
Original Manuscript Materials (1927-1929)
from the Ramsey Collection
at the University of Pittsburgh
edited by
NICHOLAS RESCHER
University of Pittsburgh, U.S.A.
and
ULRICH MAJER
Georg-August University, Göttingen, Germany



Frank Ramsey

British, born Cambridge, 1903

On Truth* *Philosophical Papers, Notes on Philosophy*

The Foundations of Mathematics and other Logical Essays

Essays in Philosophy, Logic, Mathematics and Economics, Probability and Mathematics

Highly original contributions in logic, epistemology, mathematics, and economics

Proved that in sizeable collections, total disorder is logically impossible

Developed a still widely followed model for the ideal pricing of goods and services

Devised an investment/saving formula to optimize utility in a nation's economy

Dedicated hiker and youngest ever Fellow of King's College, Cambridge

First translation of [Wittgenstein's](#) *Tractatus Logico-Philosophicus*

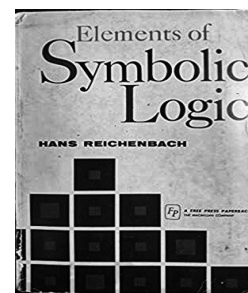
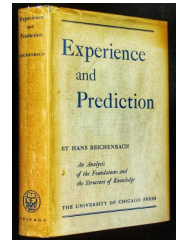
Most regrettably, died at age 27 of jaundice, having suffered chronic liver disease

Brother Michael—Archbishop of Canterbury

<http://www.informationphilosopher.com/knowledge/philosophers/ramsey/>

Once a result of thinking is obtained,
we can reorder our thoughts in a cogent way,
constructing a chain of thoughts
between point of departure and point of arrival;
it is this rational reconstruction of thinking
that is controlled by **logic**,
and whose analysis reveals
those rules which we call **logical** laws.*

The philosopher of science is not much interested
in the thought processes which lead
to scientific discoveries;
he looks for a **logical** analysis of the completed theory,
including the relationships establishing its validity.
That is, he is not interested in the context of discovery,
but in the context of justification.**



Hans Reichenbach

German/American, born Hamburg, 1891

**Elements of Symbolic Logic*

** "The Philosophical Significance of the Theory of Relativity"

Experience and Prediction; The Rise of Scientific Philosophy; From Copernicus to Einstein

Prodigious output in logic, mathematics, physics, and history of science

A primary mover in new philosophy of science

Stressed the role of logic in finding the philosophical content of scientific theories

A loyal German soldier in the Great War

Of Jewish grandparents, was ousted from Professorship at University of Berlin in 1933

Being vocally anti-Nazi, moved to Turkey and then to the USA

Distinguished professor at UCLA

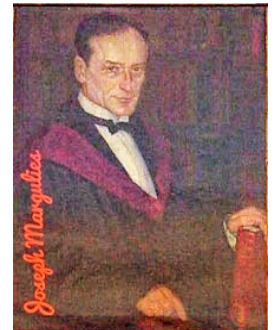
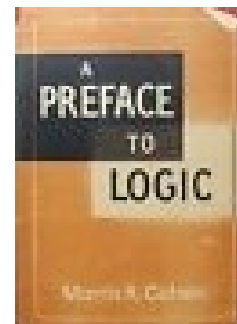
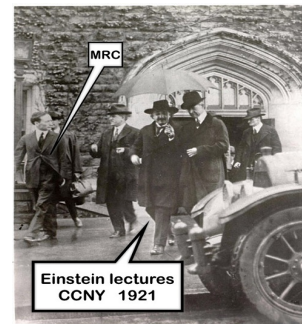
Naturalized American citizen late in life

The exercise of thought along **logical** lines
is the great liberation, or, at any rate, the basis
of all civilization.

...

The only way to overcome dogmatism
is by formulating our position
in **logical form** so that we can see
that we have taken certain things for granted,
and that someone may
from a purely **logical** point of view
start with the denial of what we have asserted.

Of course, this does not apply to
the principles of **logic** themselves.*



Morris Raphael Cohen

American, born Minsk, Russia, 1898 (to USA age twelve)

**A Preface to Logic*

Reason and Nature, Law and the Social Order

An Introduction to Logic and the Scientific Method (with [Ernest Nagel](#))

The Faith of a Liberal, The Meaning of Human History

Opposed the then pervasive idealism of [Immanuel Kant](#), [F. H. Bradley](#), and [Josiah Royce](#)

Advocated logical and objective approach to the philosophical enterprise

Professorships in both Law and Philosophy

Astoundingly quick minded and tenacious; revered by students

Committed to social-political-economic liberalism; opposed to laissez-faire capitalism

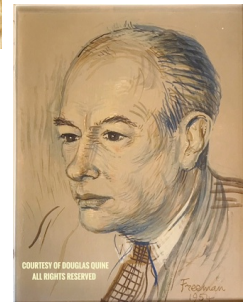
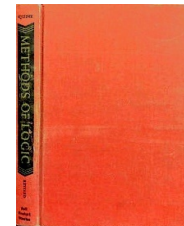
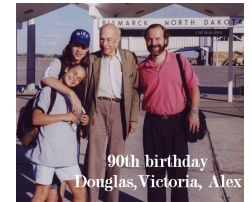
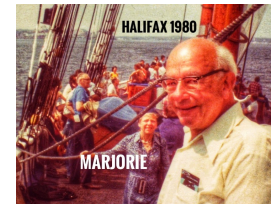
While a student at Harvard, roomed with future Supreme Court Justice Felix Frankfurter

Said that baseball is a national religion

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Logic has a universal subject matter,
and is the common denominator
of the special sciences.*

Logical inference leads from premises—
statements assumed or believed
for whatever reason—
to conclusions which can be shown
on purely **logical** grounds
to be true if the premises are true.
Techniques to this end
are a primary business of **logic**.**



Willard V. O. Quine

American, born Akron, Ohio, 1908

**Mathematical Logic*

***Methods Of Logic*

"I had naturally assumed that logic and humor were sworn enemies, never to be caught together within the covers of a single book. Quine's Methods of Logic took me aback for there, almost at the beginning, humor took its regular place in making logic crystal clear to the reader. Quine's motto was evidently: clarity yes; deadpan literalism no. One could apparently have fun while learning logic"...Israel Scheffler

Two Dogmas of Empiricism, Word and Object;

From a Logical Point of View; The Time of My Life (autobiography)

Held that only science and common sense produce knowledge

Would deny [Al-Kindi's](#) claim that logic reveals a reality that is beyond ordinary experience

At Harvard University from graduate student to Professor Emeritus

Recipient of the **Schock Prize**, the highest international honor in logic and philosophy

Was instrumental in urging European colleagues to come to America prior to the World War

Worked with the decoding of the German Enigma cipher

Fluent in French, Spanish, Italian, Portuguese, and German

Enjoyed Dixieland jazz and Mexican folk songs

Traveled to all 50 states and invited to dozens of countries

Played the mandolin at home gatherings

Typed Ph.D. dissertation and all subsequent books on his 1927 Remington

Unneeded keys replaced with important logic/math characters such as \neg , \in , \supset , \Leftrightarrow

When asked why is there no ? key, he replied **"Well, you see, I deal in certainties."**

<http://www.wvquine.org/>

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Suppose you ask a question,
“What is it that makes an argument valid?”
And the answer is, “conformity to **logic**.”

And what are the laws of **logic**?

Well, there is a series of them, of which I suppose
that the law of contradiction is the most important.

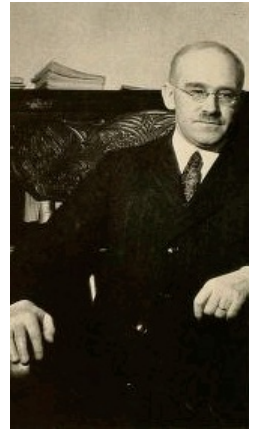
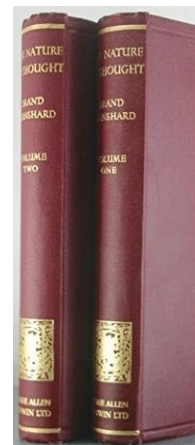
Now, how do you know
that the law of contradiction is true?

Evidently, not by argument,
because every step of the argument
would involve appeal to the law of contradiction,
so you would be moving in a circle.

Therefore, the law of contradiction must be
a self-evident, intuitively-grasped truth.

By permission , Scott Palmer, *Conversation With Brand Blanshard*, © 2008.

Logic is a set of time-less relations among concepts,
and it never descends
into the flux of events to control or divert the current.
It is eternal, and what is eternal does not act.*



Brand Blanshard

American, born Fredricksburg, Ohio, 1892

**The Nature of Thought*

Reason and Goodness, Reason and Analysis

The Uses of a Liberal Education, Reason and Belief

Revered professor at Swarthmore College and later Yale University

Pre-eminent in the preservation of classical rationalism over the last 150 years

Firm advocate of the importance of reason and reasonableness in life

Profound critiques of logical positivism and emotivism

During the Great War, volunteered in the British Army YMCA morale service

Had two rubber stamps for grading papers—one a smiling happy face, the other a shovel!!

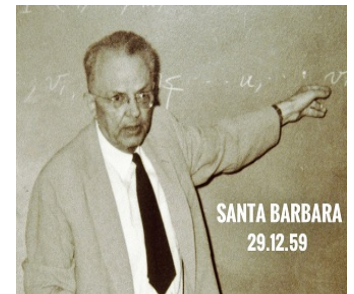
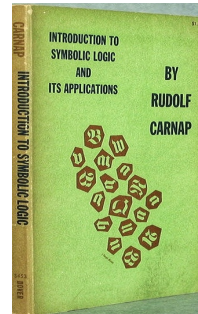
<http://www.anthoniflood.com/blanshard.htm>

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A system of symbolic **logic** is not a theory
(i.e. a system of assertions about objects),
but a *language*
(a system of signs and rules for their use)
so constructed that into it can be translated
the sentences of any given theory
about any objects whatever,
provided only that some signs of the language
have received determinant interpretations
such that the signs serve to designate
the basic concepts of the theory in question.*

Logic must often play the role of the critic,
especially in our own days.
Its task is to serve as a spiritual hygiene[§],
cautioning men against the disease
of intellectual confusion.
It has the ungrateful duty,
whenever it finds symptoms of this disease,
to pronounce the unwelcome diagnosis. ...
The logician himself has no remedy to offer,
and must turn to psychologists
and social scientists for aid.**

In **logic**, there are no morals.***



Rudolf Carnap

German, born Ronsdorf, 1891

* *Introduction to Symbolic Logic and Its Applications*

** 'Logic', pp.117f. in Edgar Adrian et alii, *Factors Determining Human Behavior*

*** *The Logical Syntax of Language*

Logical Structure of the World; *The Unity of Science*; *Introduction to Semantics*; *Meaning and Necessity*
Pseudo-Problems in Philosophy (highly recommended)

Student of [Gottlob Frege](#) at Jena; himself professor at Vienna and Prague

Prominent in the famous 1907-1934 Vienna Circle, writing its logical positivism manifesto:

that knowledge is gained through empiricism along with logical/mathematical deduction

Being pacifist/socialist and aided by [W. V. O. Quine](#) fled Germany prior to the Nazi stranglehold

Then American citizenship and on faculties at Harvard, Chicago, Princeton, and Los Angeles

Rejected metaphysics as meaningless because its statements cannot be proved or disproved by experience.

Sought a precise understanding of the difference between analytic and synthetic statements

Insisted that no empirical statement can be necessarily true.

Championed the Verification Principle: that an empirical statement is meaningful only if it is verifiable

Learned Esperanto, promoted its spread, and spoke it whenever possible

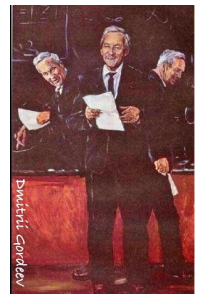
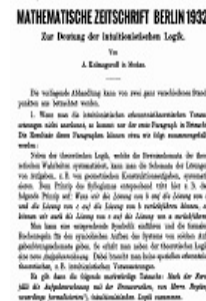
§ cf. Hygiene in [Hermann Weyl](#)

<https://archive.org/details/meaningandnecess033225mbp>

Alongside [classical] theoretical **logic**,
 which systematizes the proof schemata of theoretical truths,
 one can systematize the schemata of problem-solving.
 Then, corresponding to the principle of the [hypothetical] syllogism,
 we find for example, the following principle:
 If we can reduce the solution of Q to that of P,
 and reduce the solution of R to that of Q,
 then we can also reduce the solution of R to that of P.
 One can introduce a corresponding symbolic language,
 and give the formal calculation rules for the symbolic structure
 of the system of such problem-solving schemata.
 One thereby obtains, alongside theoretical **logic**,
 a new calculus of problems.
 Then the following remarkable fact holds:
 The calculus of problems coincides
 with Brouwer's intuitionistic **logic**.

...

If one adds the formula $P \vee \neg P$,
 (in sentential **logic**, the principle of the excluded middle),
 one obtains a complete axiom system for classical sentential **logic**.
 In our problem interpretation the formula reads as follows:
 to provide a general method for each problem P,
 either to give a solution to P
 or to derive a contradiction from the assumption of such a solution!
 In particular, if the problem Q consists of proving a statement,
 then one would need to possess a general method for each statement,
 either to prove it, or from it to derive a contradiction.*



Andrei Kolmogorov

Russian, born Tambov, 1903

* “On the Interpretation of Intuitionistic Logic”

“On the Principle of Excluded Middle”

Mathematics: Its Content, Methods, and Meaning

Foundations of the Theory of Probability

Mathematics of the 19th century, vol. 1: Mathematical logic, algebra....

Phenomenal work in numerous areas of mathematics and science; credited with founding several new disciplines

Found himself embroiled in one of the Soviet purge trials of academe in the 1930s

Married his gymnasium sweetheart

Gave personal attention to the education of gifted children

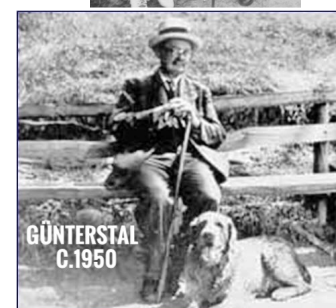
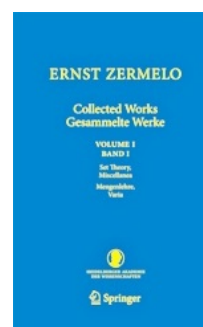
Many international awards and medals; traveled and lectured worldwide

Very interested in the structure of the poetry of Pushkin.

Now what does “prove” mean?

A “proof” is the derivation
of a new proposition
from other given propositions
that proceeds in accordance with
general **logical** rules and laws,
where the truth of the latter
secures that of the former.

In a logically complete system,
it is possible that for any proposition S
constructed from the fundamental relations
either it itself or its negation
is contained in the system.*



Ernst Zermelo

German, born Berlin, 1871

* “What is Mathematics?” (Warsaw lectures, 1929)

“Proof that every set can be well-ordered”

“On an Application of Set Theory to the Theory of the Game of Chess”

“Hydrodynamical investigations of vortex motions in the surface of a sphere”

“On boundary numbers and domains of sets.....”

Early insightful critique of the Second Law of Thermodynamics

Formulated the still standard axioms of set theory, improved by Fraenkel and [von Neumann](#)

Professor at Göttingen, Zurich, and Freiburg universities

Insisted on the Law of Excluded Middle against Intuitionism ([Brouwer](#), [Kolmogorov](#))

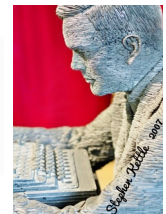
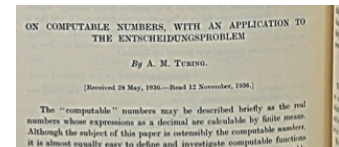
Proved that in chess there are guaranteed but non-computable win strategies

Forced out of the University of Freiburg for refusing the Nazi salute

But reinstated after the war

Age 72 married the 31-year younger Gertrud Seekamp, who outlived him by 50 years

Owing to the impossibility of finding a formal **logic** which will wholly eliminate the necessity of using intuition we naturally turn to ‘non-constructive’ systems of **logic** with which not all the steps in a proof are mechanical, some being intuitive. ...
What properties do we desire a non-constructive **logic** to have?
.... Most important of all, it must be beyond all reasonable doubt that the **logic** leads to correct results whenever the intuitive steps are correct.*



Alan Turing

British, born London, 1912

* “Systems of logic defined by ordinals”

“On computable numbers, with an application to the Entscheidungsproblem [Decision Problem]”

“Proposed Electronic Calculator”, “Intelligent Machinery”

“Programmers' Handbook for the Manchester Electronic Computer machinery and intelligence”

Considered the progenitor of the digital Computer Age

Fellow of King's College, Cambridge; Reader and Director of Mathematics at Manchester University

Devised the “Turing Test” for whether a machine can think:

If, under controlled conditions, a person has a conversation with a machine and the human is sure he is talking to a person, then the machine is thinking.

Prime genius in breaking (using advanced logic) Germany's wartime Enigma cipher

Thereby markedly shortening the war and saving untold lives

Leading figure in Mark I at Manchester, the world's first modern computer

A recognized and well regarded marathon runner

Convicted, 1952, under the Labouchère Amendment of 1885

Chose suicide and pardoned by royal decree 59 years later

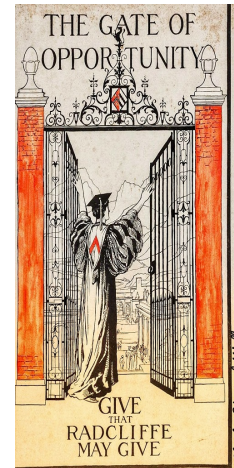
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The great value of analogy
is that by it, and it alone,
we are led to seeing a single **logical form**
in things which may be
entirely discrepant in content.
The power of recognizing similar forms
is **logical** intuition.

All may sharpen the precision
of their understanding,
by a systematic study
of principles of structure.

...

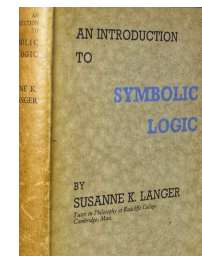
Logic develops the art of seeing structures
almost to the point of habit,
and reduces to a minimum
the danger of getting lost amid abstract ideas.*



Radcliffe Graduation



Radcliffe Tutors 1935
Susanne Knauth Langer, PH.D. philosophy



American, born New York City, 1895

**Introduction to Symbolic Logic*

The Practice of Philosophy, Reason, Rite, and Art

The Cruise of the Little Dipper, and Other Fairy Tales (during Ph.D. study)

Philosophy in a New Key (a national Best Seller)

Radcliffe B.A., and Ph.D then Ph.D. tutor

Mind: An Essay on Human Feeling (trilogy on various forms of human expression)

Dedicated to the search for the underlying meanings and forms throughout culture

Argued that art is a logical expression of emotion which ordinary language cannot approach

Translation of [Ernst Cassirer](#) *Language and Myth* a best seller in USA and UK

Highly regarded seminal analyses in aesthetics, creativity, myth, and (strikingly) music

Much sought after for public and university lecture tours; accomplished cellist and pianist

Age 8: gave a 40-minute talk on frogs, from memory; Age 12: read Immanuel Kant, in German

As a Radcliffe undergraduate, was witch/enchantress in the opera *Dido and Aeneas*

Susanne Langer

<http://www.anthonyflood.com/langer.htm>

<https://ia802307.us.archive.org/25/items/pdfy-rhrw7VPajPHIhLwH/Philosophy%20in%20a%20New%20Key%2C%20Susanne%20K.%20Langer.pdf>

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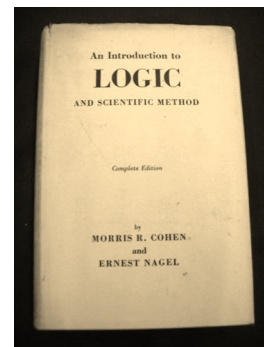
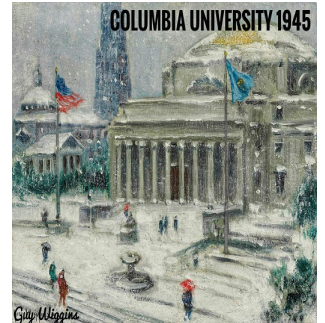
Thus the specific task of **logic**
is the study of the
conditions under which
one proposition necessarily follows
and may therefore be deduced
from one or more others,
regardless of whether the latter
are in fact true.

...

It is not the business of **logic**
to describe what happens in one's mind
as one discovers
rigorous and determinant solutions
to a problem.

That is a factual question of psychology.

Logic is relevant
at every step only in determining
whether what “seems” an implication
between one proposition and another
is indeed such.*



Ernest Nagel

American, born Bohemia, 1901 (to USA age ten)

**An Introduction to Logic and Scientific Method* (with [Morris Raphael Cohen](#))
(widely used and highly influential)

The Meaning of Reduction in the Natural Sciences

Sovereign Reason; Logic without Metaphysics

Gödel's Proof (with James R. Newman, an easy-to-understand exposition)

The Structure of Science (highly regarded)

Opposed the idealism metaphysics so prevalent at the time

Dealt masterfully with the logical structure of scientific explanation and theory

Probed the philosophical implications of relativity and quantum mechanics

Entire life in New York City (Columbia University)

Averse to travel except to summer cabin in Wardsboro, Vermont (above)

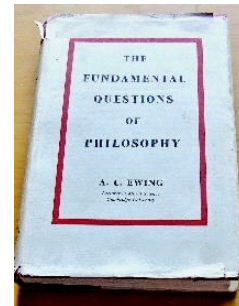
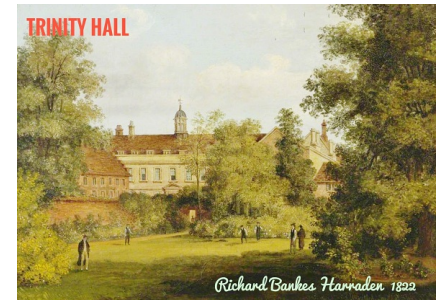
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Difficult to separate from epistemology
but still regarded commonly
as a distinct discipline is **logic**.

The laws of **logic** must be known
a priori or not at all.

They certainly are not
a matter for empirical observation.

Logic is a study
of the different kinds of propositions
and the relations between them
which justify inference which is only possible
because there are special connections
between the propositions involved
such that one necessarily follows from others.
It is a chief function of **logic**
to study these connections.*



A. C. Ewing

British, born Leicester, 1899

**The Fundamental Questions of Philosophy*

Non-Linguistic Philosophy (strong response to [Wittgenstein](#) and Philosophy of Language)

Kant's Treatment of Causality; Reason and Intuition; The Definition of Good; Ethics

The Idealist Tradition; Value and Reality: The Philosophical Case for Theism

Respected Moral Science reader at Trinity Hall, Cambridge; honorary Fellow of Jesus College

Insists that the History of Philosophy is an essential aspect of the enterprise of philosophy

Champions the long-standing traditions amidst the growth of arcane and symbolic analysis

Argues that rational philosophy affords a sound grounding for Theism

Fellow of the British Academy

I had the prized satisfaction of knowing him well over many years, and can testify to his sweetness of temper, his rare modesty, and, in the face of many frustrations, his extraordinary freedom from malice or bitterness. He was singularly impersonal and fair in controversy; his devotion to philosophy was complete; and he brought to its service one of the keenest minds of his generation..... [Brand Blanshard](#)

<https://archiveshub.jisc.ac.uk/manchesteruniversity/archives/0c39965e-de32-33ca-9202-6e8951679ffa>

Logic is concerned with the analysis of sentences
or of propositions and of proofs with attention to the form,
in abstraction from the matter.

This distinction between form and matter
is not easy to make precise immediately,
but it may be illustrated by examples:

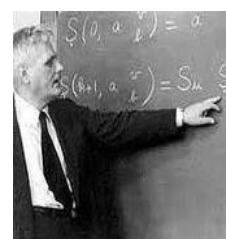
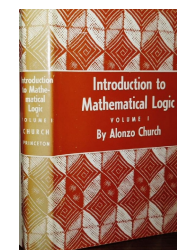
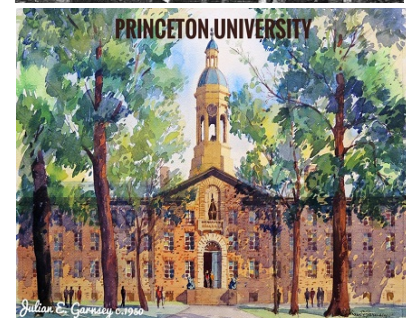
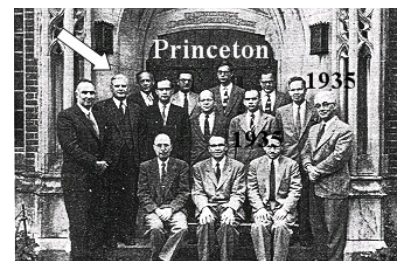
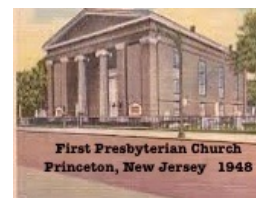
[1] I have seen a portrait of John Wilkes Booth;
John Wilkes Booth assassinated Abraham Lincoln;
thus I have seen a portrait of an assassin of Abraham Lincoln.

[2] I have seen a portrait of somebody;
somebody invented the wheeled vehicle;
thus I have seen a portrait of an inventor of the wheeled vehicle.

....

Argument 1 will be recognized as valid,
and presumably from the **logical** form alone, but 2 is invalid.

The superficial linguistic analogy
of the two arguments as stated is deceptive.
In this case the deception is quickly dispelled
upon going beyond the appearance of the language
to consider the meaning.*



Alonzo Church

American, born Washington, D. C., 1903

**Introduction to Mathematical Logic*

The Calculi of Lambda-Conversion; A Note on the Decision-Problem

An Unsolvable Problem in Elementary Number Theory

Mathematician and logician

Credited for much of the original theoretical bases of computer science

Regarded by many as the greatest America-born logician-mathematician

Proved there's no possibility of an algorithm for determining the validity an arbitrary argument

Princeton University from freshman to full professor

Looked like a "cross between a panda and a large owl"

Enjoyed and collected science-fiction novels

A devout Presbyterian

Before beginning lecture, methodically erased the blackboard spotlessly in even rows

Even had a logical way of eating breakfast:

First pour the milk into the empty bowl. Next pour in the proper amount of sugar. Stir the mixture with the breakfast spoon. Then pour in a spoonful or two of cereal. Eat that. Then pour in another spoonful or two, eat that, and so on. The sugar is evenly distributed, and the cereal never has a chance to get soggy.

Logic has the important function
of saying what follows from what....

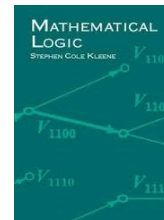
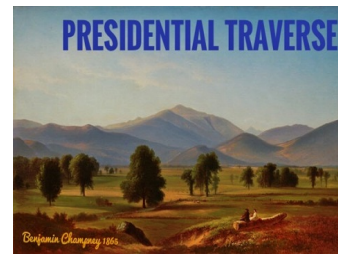
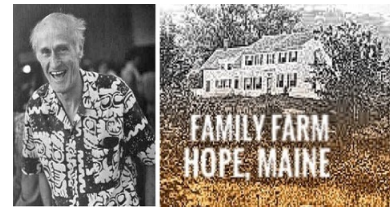
Our seeing **logical** principles
stated succinctly with the aid of symbols
may help to fix them
as part of our mental apparatus.

Thus the formal study of **logic**
may reinforce and extend our native facility.

Keep in mind the distinction between
the **logic** we are studying....

and our use of **logic** in studying it.

To any student who is not ready to do so,
we suggest that he pick some other subject instead,
such as acrostics or beekeeping.*



Stephen Cole Kleene

American, born Hartford, Connecticut, 1909

**Mathematical Logic*

Introduction to Metamathematics, Intuitionistic Mathematics

The Foundations of Intuitionistic Mathematics (with Richard Eugene Vesley)

Amherst College, summa cum laude, 44 years professor at University of Wisconsin

Lieutenant commander and Project director at the wartime Naval Research Laboratory

Work in advanced recursion theory proved crucial in the foundations of computer science

Awarded the National Medal of Science in 1990 by President George H. W. Bush

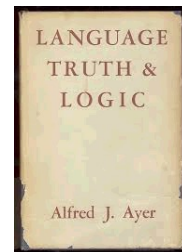
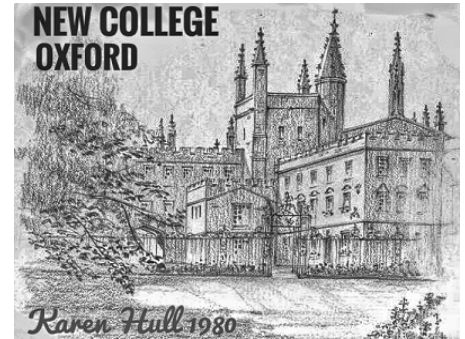
**“For his leadership in the theory of recursion and effective computability
and for developing it into a deep and broad field of mathematical research.”**

Discovered the Beloria Todde Ammiralis Ba Kleenei butterfly

An avid hiker, did the Presidential Traverse in New Hampshire (above)

A phenomenal knowledge of mushrooms

The principles of **logic** are true
simply because
we never allow them
to be anything else.
And the reason for this
is that we cannot abandon them
without contradicting ourselves,
without sinning against the rules
which govern the use of language,
and so making our utterances
self-stultifying.*



A. J. Ayer

British, born London, 1910

**Language, Truth, and Logic* (remarkably seminal work, written at age 24)

The Problem of Knowledge, The Central Questions of Philosophy

The Foundations of Empirical Knowledge, Philosophical Essays

Perhaps the century's leading scion of Empiricism and the Principle Of Verification:

Aside from logic, both meaning and truth are defined only by verifiability in experience

And therefore: religion, metaphysics, objective morality, and the like are meaningless. §

M16 Intelligence officer during the World War

Wykeman Professor of Logic, New College, Oxford; Knighted 1970

Though an atheist, claimed a near-death experience in which **"I saw a Divine Being."**

§ It was always understood that the Verification Principle rules out value judgments (even everyday ones) as cognitively meaningless. Ayer (and others) came soon to recognize that if taken baldly, it rules out also scientific theories, and that by its own lights, it is meaningless, since it is neither a logical truth nor verifiable in experience. But attempts to modify the Verification Principle appropriately have not been successful. Still, its spirit helped philosophy steer clear of the non-evidentiary metaphysics and so called "First Philosophy" of the past.

In this BBC interview, Ayer traces the origin, growth, and principles of Logical Positivism and even acknowledges major difficulties with the Verification Principle. <https://m.youtube.com/watch?v=nG0EWNezF14>

<http://www.ucl.ac.uk/~uctytho/AyerbyTH.html>

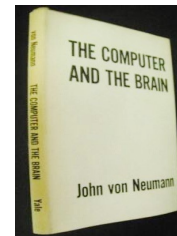
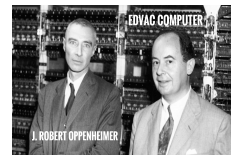
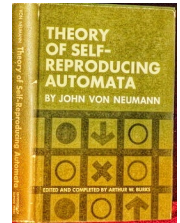
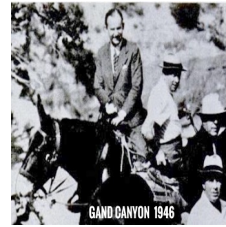
TOC

There is one important difference
between ordinary **logic** and the
automata that represent it.

Time never occurs in **logic**, but every
network or nervous system has a definite time lag
between the input system and the output response.*

'And' and 'or' are the basic operations of **logic**.
Together with 'no' (the logical operation of negation)
they are a complete set of basic logical operations—
all other logical operations, no matter how complex,
can be obtained by suitable combinations of these.**

Everybody who has worked in formal **logic**
will confirm that it is one of
the technically most refractory parts of mathematics.
The reason is that it deals with rigid, all-or-none concepts,
and has very little contact with mathematical analysis.
Thus formal **logic** is cut off from the best cultivated portions
of mathematics and forced onto the most difficult part
of the mathematical terrain, into combinatorics.***



John von Neumann

Hungarian/American, born Budapest, 1903

* “Probabilistic logics and the synthesis of reliable organisms from unreliable components”

** *The Computer and the Brain*, ****Theory of Self-Reproducing Automata*

By all accounts an amazing genius in physics, mathematics, game theory, economics, and more

By age 24, advanced set theory by combining his work with that of [Kurt Gödel](#) and Paul Bernays

First of the great mathematicians to devote major effort to the social sciences

At the Manhattan Project, devised mathematical models to obviate the risks of field tests

Saw that logical operations can be represented by numbers that can then be read and processed

For use in quantum physics, developed a subtle variant of classical Boolean logic

Leading genius in the design and building the first truly modern computer

At age six, able to figure the quotient of two eight-digit numbers in his head

Medal of Freedom for role in Manhattan Project, national security, computers (see photo above)

Then died from cancer putatively caused by atomic radiation at Los Alamos..

Dying, tragically, at age 53, several major works published posthumously

Reckless driver with many accidents, and excelled in off-color limericks

At age 30, the still youngest ever life member of Princeton’s [Institute for Advanced Study](#)

His typical irony:..... “Computers are just like humans—they do everything except think.”

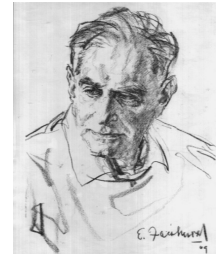
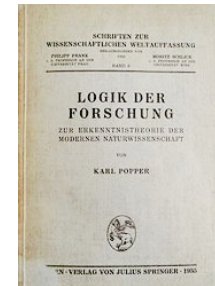
<http://www.atomicarchive.com/Bios/vonNeumann.shtml>

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The role of **logical** argument,
of deductive **logical** reasoning,
remains all-important for the critical approach;
not because it allows us to prove our theories,
or to infer them from observation statements,
but because only by purely deductive reasoning
is it possible for us to discover what our theories imply,
and thus to criticize them effectively.

Criticism...is an attempt to find
the weak spots in a theory,
and these, as a rule, can be found
only in the more remote **logical** consequences
which can be derived from it.

It is here that purely **logical** reasoning
plays an important part in science.* §



Karl Popper

(90th birthday—also see [Dewey](#) and [Suppes](#))

Austrian/British, born Vienna, 1902

**Conjectures and Refutations*

The Logic of Scientific Discovery (major advance in philosophy of science)

[Popper Selections](#) **recommended**

The Two Fundamental Problems of the Theory of Knowledge

The Open Society and Its Enemies

Famed for the Principle of Falsifiability:

“A scientific theory must have falsifiable consequences.”

1930 marriage to Josefine Anna Henninger (‘Hennie’)

Argued that while extreme intolerance is self-destructive, extreme tolerance breeds intolerance.

Dreading the rise of Nazism, moved to New Zealand and then Great Britain

Became a British citizen after the war

London School of Economics (**LSE** above) as Professor of Logic and Scientific Method

Jewish heritage, raised Lutheran, turned Marxist, turned Agnostic

§ cf. [William Minto](#)

<http://www.xenodochy.org/article/popper.html>

<http://tinyurl.com/ju4hmub>

recommended

<http://www.youtube.com/watch?v=ztmvtKLuR7I>

The blindness of past **logicians**
was the widespread lack
of the required epistemological attitude.

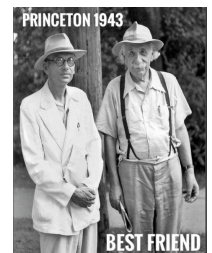
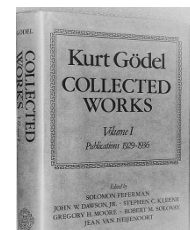
....

Objective concepts of mathematics
are fundamental to my work in **logic**.

In Hao Wang, *From Mathematics to Philosophy*

Logic is a science prior to all others,
which contains the ideas and principles
underlying all the sciences.

In James Gleick, *The Information: A History, a Theory, a Flood*



Kurt Gödel

Austrian-American, born Brunn, Austro-Hungary, 1906

On Formally Undecidable Propositions.....

The Completeness of the Axioms of the Functional Calculus of Logic

Student then professor at the University of Vienna (above)

Often met with colleagues at the Café Josephinum (above)

Before the start of the war, joined the Princeton Institute for Advanced Study

Considered the most brilliant logician of the 20th century

Amazingly, proved that some truths in formal systems can **never** be proved!

A convinced theist, rejected his friend Albert Einstein's view that God is impersonal

Was certain that: **"If the world is rationally constructed, there must be an afterlife."**

At swearing-in for American citizenship, told the judge that there is

a logical inconsistency in the Constitution to allow for a dictatorship.

But seeing Gödel's best friend Albert Einstein standing next to him,

the judge hastily silenced Gödel and conferred citizenship.

Paranoid of being poisoned, ate food if and only if prepared by his wife Adele

"Gödel is absolutely irreplaceable. In a class by himself.".....[John von Neumann](#)

<https://m.youtube.com/watch?v=w6e14vcmwKY> **FIND POSTAGE STAMP**

<http://www.marxists.org/reference/subject/philosophy/works/at/godel.htm>

Logic analyzes the meaning of concepts common to all science and establishes the general laws governing those concepts.*

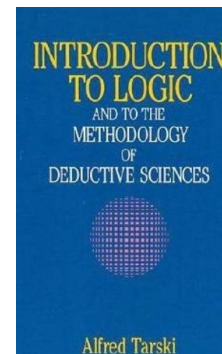
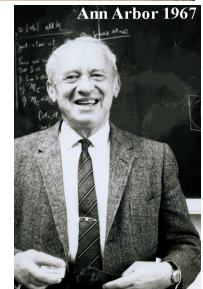
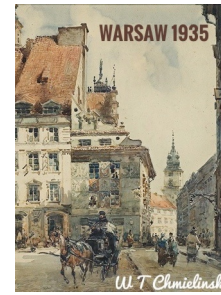
....

It was undoubtedly a great achievement of modern **logic** to have replaced the old psychological notion of proof, which could hardly ever be made clear and precise, by a new simple notion of a purely formal character.**

It is my strong belief that the fundamental ideas of modern **logic** and methodology of deductive thinking should be regarded as an essential element of higher learning and be made available to the widest possible circle of students.***

Religion and ideology divide people, **logic** brings them together.

Reliable hearsay, see [Jan Woleński](#)



Alfred Tarski

Polish-American, born Warsaw, 1901

**Introduction to Logic and to the Methodology of Deductive Sciences*

“Truth and Proof”, * “Remarks concerning the study of mathematical logic....”

“The Semantical Concept of Truth and the Foundations of Semantics”

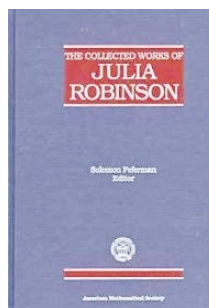
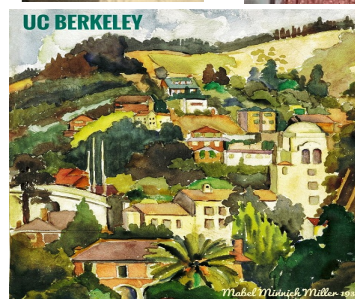
Leading figure in advancing logic far beyond Aristotle

For a Boston symposium, was on last ship from Poland before the war (see passport date above)

Naturalized American citizen in 1945

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There exist formulations of **logic** which begin by specifying a computable set of formulas called the *logical axioms*.
One then employs the rule of *detachment* (also called *modus ponens*) from A and $A \Rightarrow B$ to obtain B where A and B are each formulas of the theory.
Thus in this formulation, the theorems of the theory are those formulas obtained by iteratively employing the rule of detachment.*



Julia Bowman Robinson

American, born St. Louis, Missouri, 1919

*"Hilbert's Tenth Problem" *Collected Works*

Married her teacher Raphael Robinson, himself a prominent logician/mathematician

Major contributor in solving Hilbert's Tenth Problem, (see links below)

Plagued with severe illnesses throughout life, thus only able to teach one sixth time at UC Berkeley

Within the limits of her strength, devoted herself to Adlai Stevenson's 1952 and 1956 presidential campaigns

But eventually did become full professor

One of the earliest female members of the National Academy of Sciences

First woman president of the American Mathematical Society

PhD directed by [Alfred Tarski](#), Succumbed to leukemia at age 65

Life and accomplishment a must see movie—*Julia Robinson and Hilbert's Tenth Problem*

A truly inspirational figure

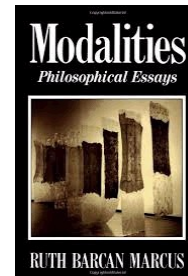
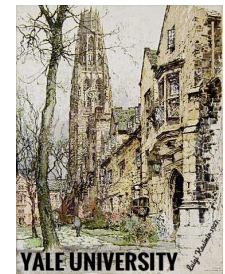
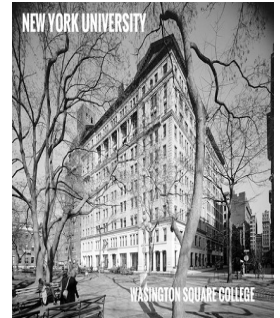
<http://www.ams.org/notices/200805/tx080500573p.pdf>

<http://www.zalafilms.com/films/juliarobinson.html>

https://www.maa.org/sites/default/files/pdf/uploa_library/22/Polya/07468342.di020720.02p00912.pdf

<http://www.nasonline.org/publications/biographical-memoirs/memoir-pdfs/robinson-julia.pdf>

One of the tasks of **logic**
is to select from all the sentences
that express the same thought
those that express it better.
The best way is the thought's
Logical Form.*



Ruth Barcan Marcus

American, born New York City, 1921

**Modalities: Philosophical Essays*

“A functional calculus of first order based on strict implication” (modal logic opus)

“The identity of individuals in a strict functional calculus of second order” (continued)

Highly prominent woman in the history of logic, distinguished professor at Yale University

Early fundamental work in and career-long exponent of modal logic

Famous for the “Barcan Formula”: a possible existence = the existence of a possibility

Argues that a coherent morality can exist in some possible world, even if not in the actual one

Awarded the Lauener Prize for Analytic Philosophy

Active participant in anti-Nazi demonstrations (see above)

On 1940 Olympics fencing team (see above), but games cancelled due to the war

<http://leiterreports.typepad.com/blog/2008/10/timothy-william.html> [click Download Laudatio]

<http://www.nytimes.com/2012/03/14/us/ruth-barcan-marcus-philosopher-logician-dies-at-90.html>

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The principles of **logical inference** are universally applied in every branch of systematic knowledge....

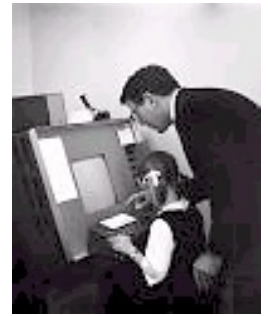
For example, if we know what forces are acting on a body and we know at a given time where the body is and what its velocity is, we may use the theory of mechanics together with the rules of **logical inference** to predict where the body will be at some future time.*

[However] in the study of **logic** our goal is to be precise and careful. The language of **logic** is an exact one....

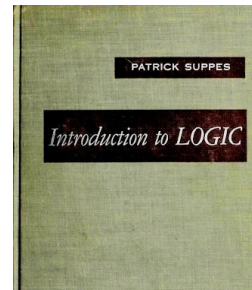
We need to draw up a set of rules that will be perfectly clear and definite and free from the vagueness we may find in natural language.**

I am doubtful of the appropriateness of the standard notions of **logical form**...

I have come to be skeptical of the long philosophical tradition of looking for various kinds of bed rocks of certainty, whether in epistemology, **logic**, or physics.***



1990 National Medal of Science
President George H. W. Bush



Patrick Suppes

(91st birthday—also see [Dewey](#) and [Popper](#))

American, born Tulsa, Oklahoma, 1922

**Introduction to Logic*

Axiomatic Set Theory

***First Course in Mathematical Logic*

Sets and Numbers, Grades K-6 (with student workbooks)

Language for Humans and Robots, Representation and Invariance of Scientific Structures

****Autobiography*

Leader in the development of logic in line with education, robotics, and the digital revolution

Honored professor at Stanford University

Acknowledged prime mover in computer-based learning

Would jokingly needle graduate students saying, “My 5th graders are better at logic than you.”

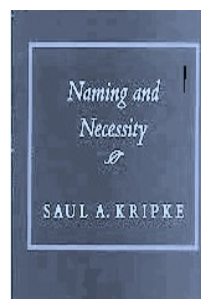
His National Medal of Science citation:

“For his broad efforts to deepen the theoretical and empirical understanding of four major areas: the measurement of subjective probability and utility in uncertain situations; the development and testing of general learning theory; the semantics and syntax of natural language; and the use of interactive computer programs for instruction.”

<https://news.stanford.edu/news/2014/november/patrick-suppes-obit-112514.html>

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Logical investigations can obviously
be a useful tool for philosophy.
They must, however, be informed
by a sensitivity to the philosophical significance
of the formalism
and by a generous admixture of common sense,
as well as a thorough understanding
both of the basic concepts
and of the technical details of the formal material used.
It should not be supposed that the formalism
can grind out philosophical results
in a manner beyond the capacity
of ordinary philosophical reasoning.
There is no mathematical substitute for philosophy.*



Saul Kripke

American, born Bay Shore, New York, 1940

* "Is there a Problem about Substitutional Quantification?"

Naming and Necessity

Wittgenstein on Rules and Private Language

Teenage sensation to senior guru

Many, many important papers still unpublished

Moving force in Modal Logic

Theory of "Rigid Designators" a cause célèbre

Though not entirely true, the story goes that when his first essay arrived at Harvard,
the philosophy department was so stunned it invited him to join the faculty.

But Saul wrote back that his mother wanted him to first finish high school.

While a sophomore at Harvard, was named University Fellow for high level math and logic

Graduated B.A. Summa Cum Laude, that being his ONLY earned degree

Numerous honorary degrees, international awards, and distinguished Professorships

Recipient of the **Schock Prize**, the highest international honor in logic and philosophy

Mission of the Manhattan SAUL KRIPKE CENTER:

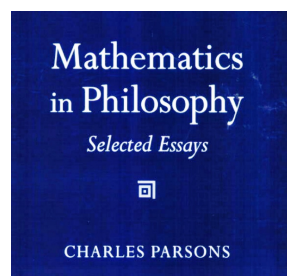
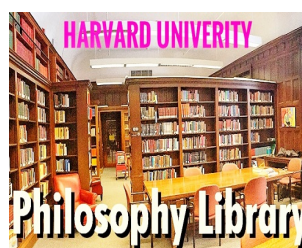
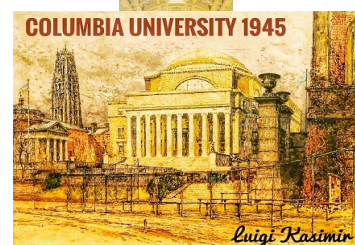
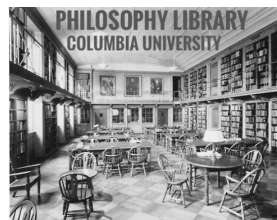
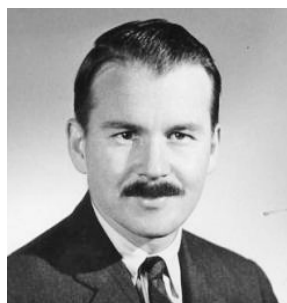
"To promote the study of the intellectual achievements of Saul Kripke." !

At 65 remarked, **"I wish I could have skipped college";**

"I probably would have learned it all anyway, just reading on my own."

http://www.nytimes.com/2006/01/28/books/28krip.html?_r=1

The generality of **logic**
is of a different kind
from that in other domains of
knowledge...
This generality is one in which
a valid formula is true
when its objects and predicates
are ranging over any domain
of objects and predicates
and its predicates are interpreted
in any possible way.*



Charles Parsons

American, born Boston, 1933

* *Mathematics in Philosophy: Selected Essays*

From Kant to Husserl, Logical and Intuitions

Mathematical Thought and Its Objects, Kurt Gödel Collected Works, Vol. III-V (co-editor)

Prominent at Cornell, Columbia, and Harvard Universities

Major work in logic, ontology, epistemology, and the philosophy of language.

Recognized scholar on mathematical intuition

Important work in foundational and epistemological issues in set theory and number theory

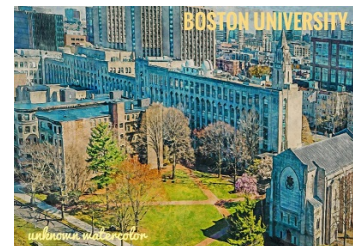
Stressed the importance of understanding the historical developments in logic, philosophy, and mathematics

Major studies on [Kant](#), [Husserl](#), [Frege](#), [Gödel](#), and [Brouwer](#)

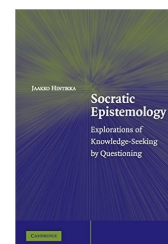
Member of the American Academy of Arts and Sciences and the Norwegian Academy of Science and Letters

Son of Talcott Parsons, acclaimed Harvard sociologist for 45 years

<http://www.harvardphilosophy.com/issues/XVII/Interview%20with%20Charles%20Parsons.%20On%20Philosophy%20of%20Mathematics.pdf>



Kirchberg am Wechsel, Austria



Jaakko Hintikka

What does a so-called rule of inference have to do with the actual drawing of inferences?

If you are given twenty-one potential premises, do the “rules of inference” tell you which conclusions you should draw from them?

What conclusions a rational person would draw?

To what conclusion would “laws of thought” lead you from the premises?

Or, deceptively, what conclusions do people usually draw from them?

The right answer is: None of the above.

In **logic** texts, “rules of inference” only tell you which inferences you may draw from the given premises without making a mistake.*

Finnish, born Vantaa, 1929

**Socratic Epistemology*

Knowledge and Belief, Inquiry as Inquiry, Philosophy of Mathematics (Readings in Philosophy)

Time & Necessity: Studies in Aristotle's Theory of Modality, Models for Modalities

The Logic of Epistemology and the Epistemology of Logic

Honored professorships at several universities

Recipient of the Rolf Schock Prize, the highest international award in philosophy

Professor at Stanford, Florida State, and Boston Universities

Foundational and extensive work in epistemic logic.

That is, under what conditions can belief constitute knowledge?

Chief architect of Independence-Friendly Logic to bypass purported pitfalls of Ordinary First-Order Quantification

30+ books, 300+ published papers, in 9+ languages

Very interested in wartime spies

Only regret: not having drunk enough champagne

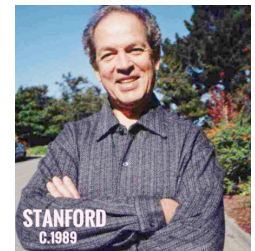
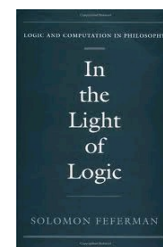
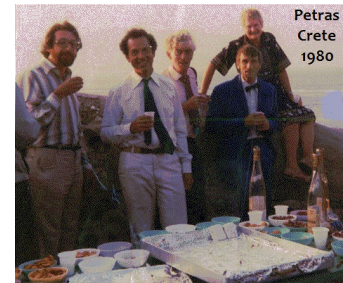
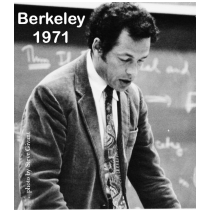
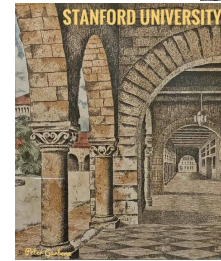
His father a mycologist, during hard times in Finland the family survived by eating a lot of mushrooms.

Coupled with intellectual courage, Jaakko's vision--which went over the heads of most people--made him a pioneer who transformed the philosophical landscape by challenging, threatening, and overturning many a cherished *idée reçue* (such as blind faith in extensionality). He was humble, committed to friendship and to being good, decent, fair, and generous with his time and power..... [Claire Ortiz Hill](#)

http://www.cle.unicamp.br/cle30-ebi-slalm/hintikka_abstract.pdf

<http://logica.ugent.be/philosophica/fulltexts/35-9.pdf>

The aim of **logic**
is to characterize the forms of reasoning
that lead invariably
from true sentences to true sentences,
independently of the subject matter.
The sentences involved are analyzed
according to their **logical**
(as opposed to grammatical) structure,
i.e. how they are compounded from their parts
by means of certain operations
on propositions and predicates....
To spell this out in general, one must explain
how the truth of compounds under given operations
is determined by the truth of the parts,
and characterize those forms of rules of inference
for the given operations
that insure preservation of truth.*



Solomon Feferman
(with W. V. O. Quine)

American, born New York City, 1928

* "Which Quantifiers are Logical? A combined semantical and inferential criterion"

In the Light of Logic, Kurt Gödel, *Collected Works* (editor-in-chief)

Model-Theoretic Logics (editor, with J. Barwise), *Alfred Tarski: Life and Logic*, with Anita Burdman Feferman

The Number Systems: Foundations of Algebra and Analysis

Scores of articles in journals and collections

Distinguished professor of philosophy and mathematics at Stanford University

A truly prolific and influential force in mathematical logic and the foundations of mathematics

Recipient of the **Schock Prize**, the highest international honor in logic and philosophy

As a 19 year old student waiter, served a boiled egg to Robert J. Oppenheimer (father of the atomic bomb)

Logic has been long interested in whether answers to certain questions are computable in principle, since the outcome puts bounds on the possibilities of formalization. More recently, precise comparisons in the efficiency of decision methods have become available through the developments in complexity theory.

These, however, are applications to **logic**, and a big question is whether methods of **logic** have significance in the other directions for the more applied parts of computability theory.....

My own work has concentrated on seeing whether the ideas of **logic** can be used to give a better conceptual understanding of programming languages.*

One often hears that modal (or some other) **logic** is pointless because it can be translated into some simpler language in a first-order way.

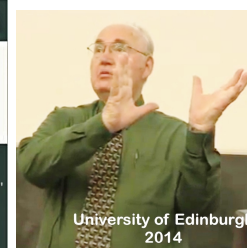
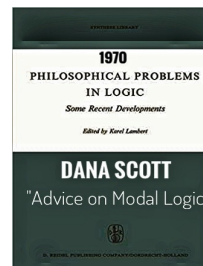
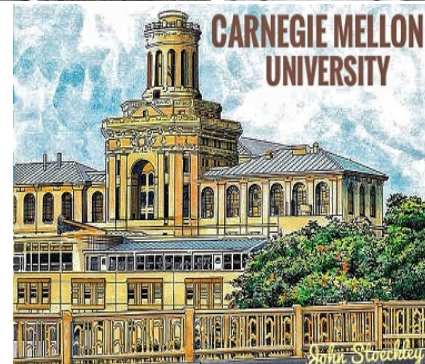
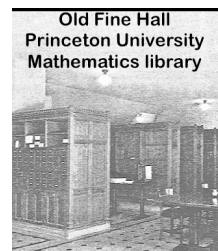
Take no notice of such arguments.

There is no weight to the claim that the original system must therefore be replaced by the new one.

What is essential is to single out important concepts and to investigate their properties.....

All kinds of statements have indirect reference to the here, the now, the I (first person). These statements have a **logic**, and it is possible to say that some of these are true by virtue of their syntactical form.

Thus in view of the commonness and simplicity of these statements, we are certainly obliged to investigate their intrinsic **logic**.**



Dana Scott

American, born Berkeley, California, 1932

* "Logic and Programming Languages" his Turing Award Lecture

** "Advice on Modal Logic"

"Finite Automata and their Decision Problem" with Michael O. Rabin

Outline of a Mathematical Theory of Computation a technical report

Toward a Mathematical Semantics for Computer Languages a technical report with Christopher Strachey

"Semantic Domains" with C. A Gunter

Studied with [Alfred Tarski](#) at UC Berkeley, and Ph.D. directed by [Alonzo Church](#) at Princeton

Founded the field of denotational semantics, as a mathematical foundation for programming languages

Professorships at Princeton, Oxford, Amsterdam, Stanford, Linz, Chicago, Berkeley, Carnegie Mellon

Honorary Fellow of Merton College, Oxford, and, over the years, researcher at other venues

Numerous awards including the Rolf Schock Prize, the Bolzano Medal, and the ACM Turing Award

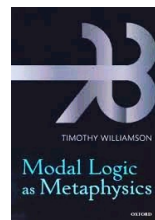
Honorary doctorates from Utrecht, Darmstadt, Edinburgh, Ljubljana, and St. Andrews

TOC

Logic is necessary but not sufficient for solving philosophical problems. To make progress in philosophy we need to use long chains of reasoning in areas where it is very hard to distinguish valid from invalid reasoning.*

Logic resembles good poetry: precise, radical, imaginative, elegant, powerful, orderly, subtle, reflective, and accurate.**

** Authorized rewording from session with photographer Steve Pyke, March 2003



Timothy Williamson

British, born Uppsala, Sweden (as British citizen), 1955

* “Interview with Chen Bo” (see link below)

The Philosophy of Philosophy, Knowledge and Its Limits

Vagueness, Identity and Discrimination, Modal Logic as Metaphysics

“My central theme is the gap between what is true and what can be known.”

“To be precise is to make it as easy as possible for others to prove one wrong.

That is what requires courage.”

Wykeham Professor of Logic, New College, Oxford

Prefers the likes of Jane Austen and Dashiell Hammett:

“who are clever, clear-eye, and exact, but who don’t attempt to do philosophy.”

http://www.fitelson.org/few/few_06/twilliamson.pdf

<http://opinionator.blogs.nytimes.com/2012/05/13/logic-and-neutrality/>

http://www.ucd.ie/philosophy/perspectives/resources/issue3/Perspectives_volumeIII_Modality.pdf

<http://hardproblem.ru/interview/t-williamson/lang-pref/en/>

RIP: Bernard of Chartres used to say that we are like dwarfs on the shoulders of giants, so that we can see more than they, and things at a greater distance, not by virtue of any sharpness of sight on our part, or any physical distinction, but because we are carried high and raised up by their giant size.

John of Salisbury, *Metalogicon*, 12th century

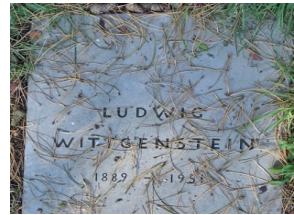
TOC



David Hilbert



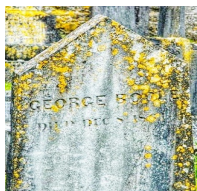
Kurt Gödel



Ludwig Wittgenstein



Karl Popper



George Boole



Constance Jones
[read inscription](#)



Gottlob Frege



Charles S. Peirce



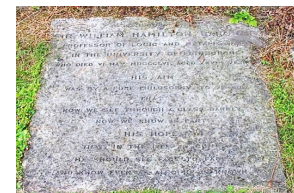
Isaac Watts



Gottfried Leibniz



Bernard Bolzano



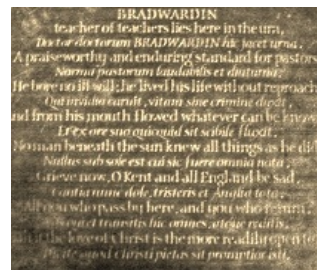
William Hamilton
[read inscription](#)



John of Salisbury



Duns Scotus



Thomas Bradwardine
[read inscription](#)



Blaise Pascal



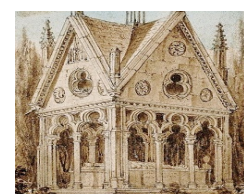
Aristotle



Boethius



Avicenna

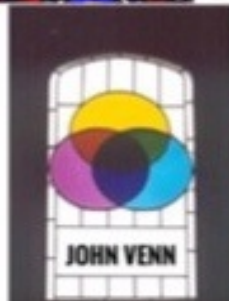


Abelard and Eloise

PHILATELIC LOGIC



STAINED GLASS



[BACK](#)

TOMBSTONE INSCRIPTIONS

Thomas Bradwardine

Teacher of teachers lies here in the urn,
A praiseworthy and enduring standard for pastors.
He bore no ill will: he lived his life without reproach:
And from his mouth flowed whatever can be known.
No man beneath the sun knew all things the way he did
Grieve now, O Kent and all England be sad.
All who pass by here and all who return
Know that the love of Christ is the more readily open to them.

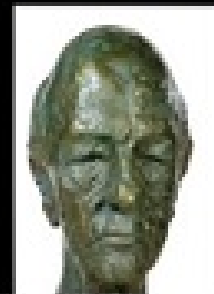
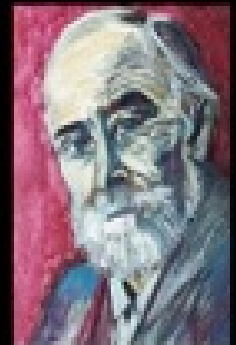
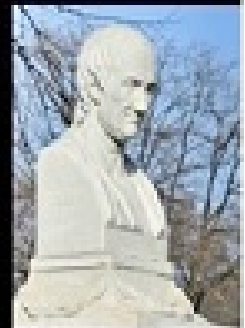
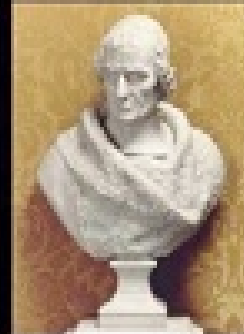
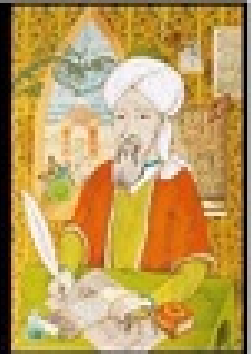
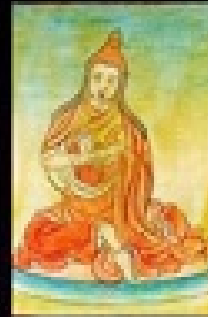
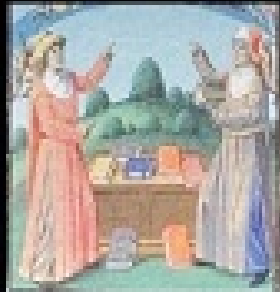
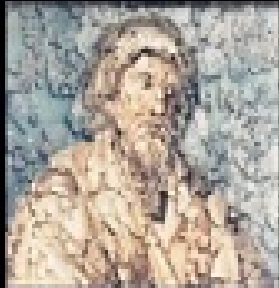
William Hamilton

Sir William Hamilton baronet
Professor of logic and metaphysics
In the University of Edinburgh
Who died VI May MDCCCLVI aged LXVII years
His aim was by a pure philosophy to prove
That now we see through a glass darkly
Now we know in part.
His hope was that in the life to come
He should see face to face
And know even as also he is known.

Constance Jones

Her life was illuminated
By her love of truth and of justice,
By her sympathy and kindness
And her zeal for knowledge.
In Thy light shall we see light.

David Marans



Aristotle	Apuleius	Plotinus/Porphyry	Dharmakīrti	Avicenna
William of Ockham	Lorenzo Valla	Juan Luis Vives	Antoine Arnauld	Gottfried Leibniz
Isaac Watts	Bernard Bolzano	George Boole	Richard Whately	Gottlob Frege
Constance Jones	Bertrand Russell	Henri Bergson	Alfred Tarski	Willard V. O. Quine

Christine Ladd Franklin

Early Feminist

Women and Letters.

To the Editor of The New York Times:

Isn't it rather absurd that an American Academy of Arts and Letters should be an exclusively male Academy of Arts and Letters? Isn't it rather absurd that Edith Wharton, for instance, who is without question the most distinguished American in the realm of letters, should not have been invited to join a self-constituted body of "immortals"? There is rather more excuse perhaps for an authors' club preferring to be a male authors' club if that is what seems good to it, but as soon as a group of writers and artists arrogate to themselves a name of such special connotation as "Academy" the situation is different, and they show themselves very lacking, in good taste at least, if they exclude women. This very Academy, in fact, did better than this at its beginning, for Julia Ward Howe was a member of it until her death.

It is a long time since other organizations have found any reason for not admitting women. The scientific societies, for instance, have not only admitted them but have treated them with all deserved honor; Professor Calkins of Wellesley has been President of both the Psychological Association and the Philosophical Association, and this very month the Psychological Association meeting at Princeton will be presided over by Professor Washburn of Vassar. Does not the Academy of Arts and Letters (which ought if anything to be further advanced in the humanities than the plain scientists) feel that it is rather old-fashioned?

CHRISTINE LADD FRANKLIN.

Columbia University, Dec. 10, 1921.

[back to Bradley](#)

[back to Russell/Whitehead](#)

The Order of Merit, founded in 1902 by King Edward VII, is a special mark of honor conferred by the Sovereign of Great Britain on individuals of exceptional distinction in the arts, learning, sciences and other areas such as public service. Appointment to the Order is the Sovereign's personal gift and ministerial advice is not required.



CODA ONE



French political philosopher Charles-Louis Montesquieu (1689-1755)

A Light Purgative

Take three leaves of Aristotle's **logic** in Greek,
two leaves of a treatise on scholastic theology,
the keener the better, as, for example,
that of the subtle Scotus; four of Paracelsus;
one of Avicenna; six of Averroes; three of Porphyry;
as many of Plotinus, and as many of Iamblicus.

Infuse the whole for twenty-four hours, and take four doses a day.

Persian Letters, CXLIII

The *Persian Letters* is a satire on the senseless, archaic, harmful, and foolish aspects of both European and Eastern culture—in law, religion, medicine, government, society, education, philosophy, etc.

“A Light Purgative” mentions six writers who are included in ***Logic Gallery***.

The other two, Paracelsus (Germany, 16th century) and Iamblichus (Syria, 3rd century) are best remembered for popular myths, magical formulas, and astrological curatives.

CODA TWO



German poet, playwright, novelist, scientist, statesman, director, critic, and artist
Johann Wolfgang von Goethe (1749 – 1832)

Mephistopheles:

Use your time well: it slips away so fast, yet
Discipline will teach you how to win it.
My dear friend, I'd advise, in sum,
First, the Collegium **Logicum**.
There your mind will be trained,
As if in [Spanish boots](#), constrained,
So that painfully, as it ought,
It creeps along the way of thought,
Not flitting about all over,
Wandering here and there.
So you'll learn, in many days,
What you used to do, untaught, as in a haze,
Like eating now, and drinking, you'll see
The necessity of One! Two! Three!
Truly the intricacy of **logic**
Is like a master-weaver's fabric,
Where the [loom](#) holds a thousand threads,
Here and there the shuttles go
And the threads, invisibly, flow,
One pass serves for a thousand instead.
Then the philosopher steps in: he'll show
That it certainly had to be so:
The first was - so, the second - so,
And so, the third and fourth were - so:
If first and second had never been,
Third and fourth would not be seen.

Faust, Part One

CODA THREE



German novelist and social critic Thomas Mann (1875-1955)

Nor would I forget that we marched off to war at the time
with a comparatively pure heart
and did not believe our previous behavior at home
had been such that a bloody global catastrophe need be regarded
as the inevitable **logical consequence** of our domestic conduct....
[Yet] if it is true, as the German proverb has it,
that every path to a right goal is right every step of the way,
then one must admit that the path that led to this doom
was doomed at every point, at every turn,
however bitter to endorse this **logic**.

Doctor Faustus

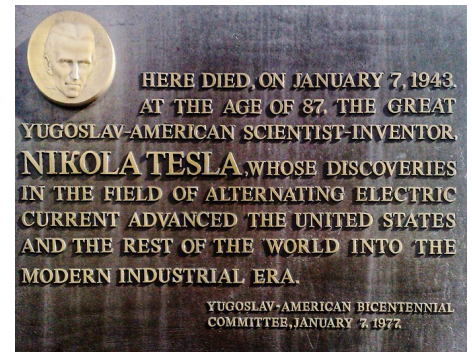
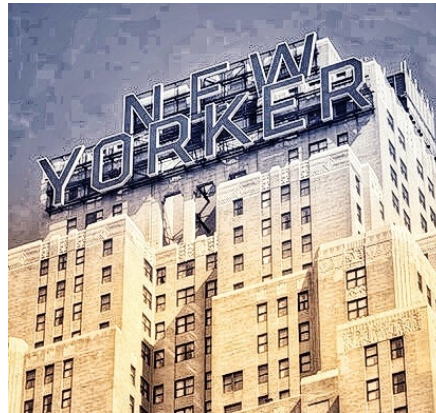
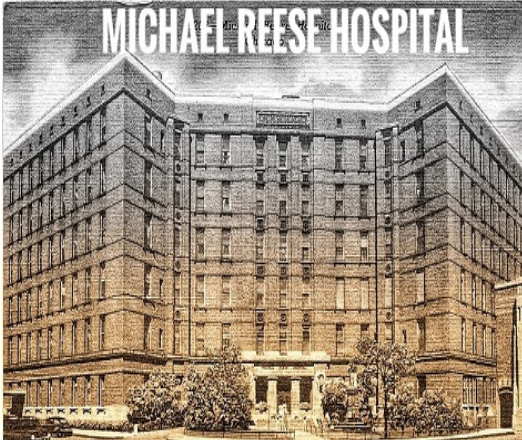
The context here is the Second World War.

[BACK](#)

David Marans



Ancillary Profession



see quotation in [FOREWORDS](#)

BORN: in Michael Reese Hospital the same hour Nikola Tesla died in the Hotel New Yorker.

EDUCATION: Brooklyn, Coral Gables, Cambridge

POSITION: Philosophy professor, St. Thomas University, Florida

AUTHORS: Sarah Orne Jewett, Charles Sanders Peirce, Ernst Cassirer, Sinclair Lewis, Karl Popper, Thomas Mann, Winston Churchill, Willard Quine, Josiah Royce, Miguel Montaigne, Henry James, Immanuel Kant, Thomas Hardy, Geoffrey Chaucer

COMPOSERS: J. S. Bach, Irving Berlin, Chopin, Corelli, Stephen Foster, George Gershwin, Handel, Haydn, Jerome Kern, Mozart, Offenbach, Palestrina, Pergolesi, Richard Rogers, Schumann, John Philip Sousa, Richard Strauss, Vivaldi

FILM: Blue Angel (1930), Fail Safe (1964), Modern Times, To Be or not to Be 1942), M (1930), Witness for the Prosecution (1957), Maltese Falcon, Key Largo, Here Comes Mr. Jordan (1941), Strangers on a Train, The Petrified Forrest, Double Indemnity, The Producers, Dodsworth, Grand Hotel (1932), City Lights, Dinner at Eight (1933), Dial M for Murder, Olympiad, Metropolis

EMAIL: chicago194317@gmail.com

Proof for the Law of Explosion

by C. I. Lewis in Lewis and Langford, *Symbolic Logic*, 1932

From any proposition of the form $p \sim p$, any proposition whatever, q , may be deduced as follows:

Assume $p \sim p$. (1)

(1) $\vdash p$ (2)

If p is true and p is false, then p is true.

(1) $\vdash \sim p$ (3)

If p is true and p is false, then p is false.

(2) $\cdot \vdash \cdot p \vee q$ (4)

If, by (2), p is true, then at least one of the two, p and q , is true.

(3) \cdot (4) $: \vdash \cdot q$

If, by (3), p is false; and, by (4), at least one of the two, p and q , is true; then q must be true.

In light of purported true contradictions, paraconsistent logic and dialetheism (1970 fl.) devise ways to reject the Law of Explosion. They oppose the laws of Addition (at line 4) and Disjunctive Syllogism (using 3 and 4). While common sense accepts Explosion as simply a warning to avoid contradiction. Still in a much wider sense, all can agree with Ralph Waldo Emerson, that "A foolish consistency is the hobgoblin of little minds."